

HEATHKIT

Winter Fun
1970



more
NEW KITS
this issue • see back cover

- New Heathkit AR-19 60 Watt AM-FM FM Stereo Receiver—See pages 8 & 9
- New Heathkit GD-109 18 Watt Stereo Phone—See page 63
- New Heathkit SB-220 2KW Linear Amplifier—See page 43
- New Heath X-Ray Machine Simulator— See page 42
- New Heathkit MI-29 Electronic Fish Spotter—See page 59
- New Heathkit MI-19 Solid-State Depth Sounder—See page 59
- New Heath MWW-18 VHF-FM Radio telephone—See page 57

Factory Mail Order Prices Valid to March 16, 1970

Heath Company—a Schlumberger company Benton Harbor, Michigan 49022

Catalog Supplement 800/01

NEWS AND VIEWS OF HEATHKIT®

READ WHAT ELECTRONIC EXPERTS SAY
ABOUT HEATHKIT COLOR TV . . .

POPULAR ELECTRONICS . . . "Heath keeps producing winners. This season it's the deluxe GR-681 Color TV kit. Couple this receiver with the ultrasonic remote control, put it in a cabinet, and you've got more convenience and color picture fidelity than you can buy for nearly twice the money!"

MODERN HI-FI & STEREO GUIDE . . . "The Heathkit (GR-681) can well be a spoiler. The only sets we've seen better color pictures on are the \$4000 Conrac professional monitors used in the TV stations themselves. While we're tossing out superlatives, let's just say that the Heath will give you a far better color picture than any other set on the consumer market."

ELEMENTARY ELECTRONICS . . . "You can buy a good color TV just about anywhere. But regardless of how much you're prepared to spend, you can't buy a great production-run color TV. The only way you can get truly great color performance is to build the set yourself . . . a Heathkit color set; in particular, the Heathkit GR-681. Many of us in electronics, particularly those who handle literally mountains of equipment, have used the Heath color TV's as the standard of comparison for color sets. In the GR-681 chassis the Heath people have maintained their superb color reproduction, and they have added excellent color stability through the use of automatic fine tuning. As I said, if you want a great color TV set, I have to build a Heathkit."

TECHNICAL NEWS . . . "I have seen many commercial color TV's but none better than Heathkit and most not as good."

"Other top of the line color sets produce fine pictures, but I feel that Heathkit is still the best."

"I have never seen a better picture on any TV no matter what the price."

"I work on network transmission of TV signals and reception at home almost equals pictures I see at work on monitors much more expensive than Heathkit."

"The set performs outstandingly and receives plaudits of all guests."

"About your claim, 'the most advanced color TV on the market,' I believe it now . . . so do my friends."

"I am very pleased with the superior quality of color and sharpness of picture."

"Everyone that has seen my GR-681 says it is the best color and picture they have seen."

"The finest color set I have observed, without exception."

"The picture quality is superior to any commercially built set I've ever seen."

"I have never seen a color TV which measures up to the quality of the Heathkit."

"I have compared it with commercial sets of several makes . . . it beats them all."

"The color quality and reception is the finest I've seen in our area."

"Reception on our Heathkit color TV is superior to any other set I've seen . . ."

". . . made final adjustments and the color was fantastic!"

". . . the set worked the first time . . . the performance is equal to or superior to any color TV I've seen."

MECHANIX ILLUSTRATED . . . "The Heath set is a high-quality receiver when built; nothing comparable to it is on the market."



PRESIDENT'S LETTER

Dear Friends:

It is a pleasure to start the New Year with good news.

First . . . color picture tube manufacturers have made substantial price reductions on all picture tubes shipped to us after January 1. These reductions are passed on to you in the new lower prices on all Heathkit Color TV's. See pages 3 through 6. The welcome price reductions, coupled with the new improved circuitry in all models, make Heathkit Color TV an even greater value than before.

More good news is about interesting new products. For the fishermen, the new Heathkit "Fish-Spotter" on page 59 . . . a low cost electronic way to find fish. For the boaters, the new Heath VHF-FM Radiotelephone on page 57, and new Heathkit Depth Sounders on page 59. For amateur radio ops, the new Heathkit 2 KW Linear Amplifier on page 43. For music listeners, a new Heathkit Stereo Phonograph on page 63, and a new 60-watt AM-FM Stereo receiver on page 8. As the New Year begins, we wish to extend our thanks for your continued support and our best wishes to you and your family.

Sincerely,
Dave Nurse, President

AND HERE'S WHAT HEATHKIT COLOR TV OWNERS HAVE TO SAY ABOUT THEIR SETS . . .

"I have seen many commercial color TV's but none better than Heathkit and most not as good."

"Other top of the line color sets produce fine pictures, but I feel that Heathkit is still the best."

"I have never seen a better picture on any TV no matter what the price."

"I work on network transmission of TV signals and reception at home almost equals pictures I see at work on monitors much more expensive than Heathkit."

"The set performs outstandingly and receives plaudits of all guests."

"About your claim, 'the most advanced color TV on the market,' I believe it now . . . so do my friends."

"I am very pleased with the superior quality of color and sharpness of picture."

"Everyone that has seen my GR-681 says it is the best color and picture they have seen."

"The finest color set I have observed, without exception."

"The picture quality is superior to any commercially built set I've ever seen."

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"I have compared it with commercial sets of several makes . . . it beats them all."

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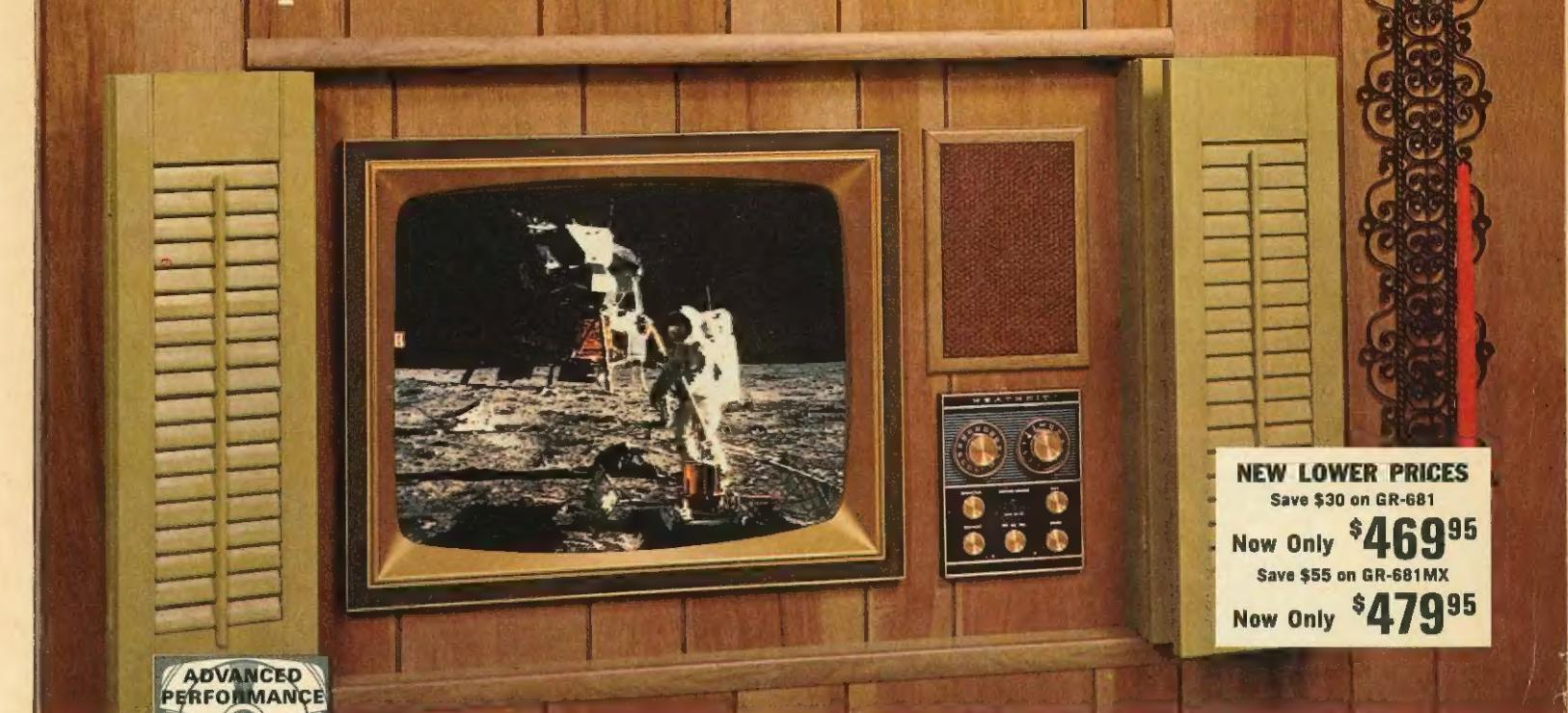
"Reception on our Heathkit color TV is superior to any other set I've seen . . ."

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MECHANIX ILLUSTRATED . . . "The Heath set is a high-quality receiver when built; nothing comparable to it is on the market."

New Improved Heathkit® AFT "681" . . . New Lower Prices



NEW LOWER PRICES

Save \$30 on GR-681

Now Only **\$469.95**

Save \$55 on GR-681MX

Now Only **\$479.95**

Now—New, Improved GR-681 . . . With Sharper, Clearer Pictures Plus The New Color Picture Tube You've Read About That Gives Brighter Pictures, More Vivid Colors . . . Better Than Ever & Lower Cost Too! . . . See Details On Page 2

• Built-in Automatic Fine Tuning for perfect pictures on all VHF/UHF channels • Built-in Power Tuning • Built-in remote control • Top quality American brand color tube with 295 sq. inch viewing area, and anti-glare safety glass • New improved phosphors for brighter, livelier colors • Automatic degaussing • Exclusive built-in self-servicing aids • 3-stage video IF strip reduces interference, improves reception • New improved retrace blanking circuit • Exclusive Heath Magna-Shield improves color purity • Gated Automatic Gain Control for steady, jitter-free pictures • Automatic Color Control circuit reduces color fading • Two Hi-Fi sound outputs—listen thru the built-in 6" x 9" speaker or connect to your hi-fi system • Bridge-type low voltage power supply • All critical circuits factory assembled and aligned • Two VHF antenna inputs • Circuit breaker protection • 2-year picture tube warranty, 90 days on all other parts • Easy to build

The Most Advanced Color TV On The Market. A strong claim, but the new "681" can meet it and we invite a critical comparison with every other color TV available—there isn't one around that has all of these features.

New Improved Circuitry. Recent circuit improvements in the "681" provide increased video frequency bandwidth for clearer, sharper, more detailed pictures.

Built-In Automatic Fine Tuning (AFT) . . . solid-state circuitry and an integrated circuit combine to eliminate touchy fine tuning forever. The AFT circuit always tunes in the best color picture exactly, automatically, on all 82 channels. And, the AFT module is completely factory assembled and aligned . . . just wire it in.

Built-In Remote Control . . . the compact, lightweight cable-type remote control allows you to turn the "681" on & off and change VHF channels from the comfort of your chair. Or add the optional GRA-681-6 Wireless Remote Control described on next page.

Bridge-Type Low Voltage Power Supply . . . for superior regulation and better all-around performance. High & Low AC taps are provided for areas where the house power is higher or lower than 120 volts, which causes shrinking or enlarging of the picture on other sets. Just connect to the proper tap and the "681" will give you perfect picture size.

Power Tuning . . . just push the button on the front panel and the VHF channel selector rotates until you reach the station you want.

Automatic Degaussing Circuit . . . demagnetizes & "cleans" the picture every time you turn the set on from a cold start; eliminates manual degaussing when you move the set too.

Dynamic Pinching Correction Circuit . . . keeps all four edges straight for a full, distortionless picture.

2-Speed, Transistor UHF Tuner . . . for fast selection of all UHF channels or fine tuning of individual stations.

Two VHF Antenna Inputs . . . 300 ohm balanced & 75 ohm coaxial inputs.

Exclusive Heathkit Features That Can't Be Bought On Any Set, At Any Price . . . like the self-servicing aids that allow you to perform the periodic convergence and color purity adjustments that all color TV sets require. And the tilt-out dynamic convergence secondary adjustment control panel that lets you adjust the convergence, when you decide it's needed.

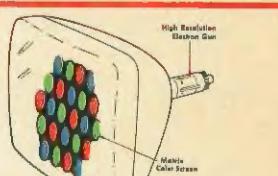
Improved Color Picture Tube At No Extra Cost. Recent phosphor improvements have resulted in a color picture tube noticeably superior to former versions in brightness. This picture tube, now standard on the GR-681, means your picture will be better than ever . . . colors much brighter. **Choice Of Installation . . .** mount your new "681" in a wall, your own custom cabinet or one of the beautiful Heath factory assembled cabinets shown on the next page. And the universal main control panel can be mounted at the top, bottom or right side of the chassis for custom mounting. **Easy To Build . . .** all critical circuits (AFT, VHF & UHF tuners, 3-stage IF strip and high voltage supply) are pre-assembled & pre-aligned.

Kit GR-681, all parts including chassis, tubes, mask, UHF & VHF tuners, AFT, cable-type remote control and 6" x 9" speaker, 135 lbs. **only \$469.95**

Kit GR-681MX, all parts with Matrix picture tube, 135 lbs. **only \$479.95**

GR-681 SPECIFICATIONS—Picture size: Rectangular viewing area approx. 295 sq. inches (23" diagonally, 20" horizontal, 16" vertical). Tube size: 25" overall diagonal measurement. Deflection: 90°. Focus: Electrostatic. Convergence: Magnetic. Antenna input impedance: 300 ohm balanced, or 75 ohm unbalanced (VHF). Picture IF carrier frequency: 45.75 MHz. Sound IF carrier frequency: 41.25 MHz. Color subcarrier: 42.17 MHz. Video IF bandpass: 3.52 MHz. Sound IF frequency: 4.5 MHz. Tuning range: VHF channels 2-13, UHF channels 14-83. Sound cathode follower: Output impedance: 3 K. Frequency response: ±1 dB, 50-15,000 Hz. Harmonic distortion: less than 1%. Output voltage: 2 v. Audio output: Output impedance: 8 ohms. Output power: 2 watts. Frequency response: ±2 dB, 50-10,000 Hz. Harmonic distortion: less than 3%. Automatic fine tuning: VHF channels 2-13, UHF channels 14-83. Power tuning: Automatically selects any VHF channel and one preselected UHF channel. Remote control: Cable-type; controls on/off function and changes VHF channels. Low voltage power supply: Bridge-type; includes High & Low AC line taps. Power requirements: 110-130 V., 60 Hz AC, 330 watts. Chassis & Tube Dimensions Only: 20 1/4" H x 25 1/4" W x 19 1/4" D. Control panel assembly: 6 1/2" W x 7 1/2" H x 9" D. Required installation clearances are given in spec sheet & manual.

Optional New RCA Hi-Lite Matrix Tube For Your New "681" Or "295" Delivers Increased Resolution and Brightness . . . and Now The Manufacturer Has Reduced Prices Substantially



The Industry's Sharpest, Brightest, Color Picture. The new electron gun in this premium-quality RCA tube focuses the electron beam on the phosphor dots more precisely . . . gives a 25% increase in resolution for a sharper picture. The black matrix around the phosphor dots in this new tube eliminates reflected light and permits the use of a higher transmission glass for greater light output. Order your new "681" or "295" with the new top-of-the-line RCA Matrix tube.

Kit GR-681MX, all parts with new "Hi-Lite" Matrix picture tube, 135 lbs. **now only \$479.95**

Kit GR-295MX, all parts with new "Hi-Lite" Matrix picture tube, 131 lbs. **now only \$429.95**

See Cabinets Next Page

GR-681 Shipped REA or Motor Freight Only

These Handsome Factory-Assembled Cabinets Fit Either "681" or "295" (New AC Interlock Provided)

Now Heathkit® "295" Color TV Costs Less



Mediterranean Oak Cabinet.....\$124.95
Factory assembled of selected furniture hardwoods, finished in luxurious oak; styled in newest Mediterranean motif. Stately bronze trim handle. Overall dimensions 45 1/2" W x 20 1/2" D x 31" H. Assembled GRA-295-4, 85 lbs... Express or motor freight.....\$124.95



Deluxe Early American TV Cabinet. \$109.95
Made of a special combination of veneers and solids... all beautifully finished in popular Salem-Maple. GR-295 speaker and convergence panel mount behind grille cloth on right side. Measures 19 1/4" D x 31" H x 36" W. Assembled GRA-295-3, 67 lbs... Express or motor freight.....\$109.95



Contemporary Styled Walnut Cabinet \$64.95
Factory assembled of fine veneers and solids with oil-rubbed walnut finish. GR-295 speaker and convergence panel mount behind grille cloth on right side. Measures a slim 19" D x 31" H x 34 1/2" W. Assembled GRA-295-1, 56 lbs... Express or motor freight.....\$64.95

Reception Is Simulated On All Sets Shown On These Pages

Control Your Heathkit Color TV The Easy Electronic Way With This Wireless Remote Control

You can add the comfort and convenience of full remote control to any rectangular tube Heathkit color TV, with these easy-to-build, easy-to-use remote control kits. All solid-state circuitry gives you armchair control of on-off, volume, color, tint and VHF channel selection. Available for models GR-681, GR-581, GR-481, GR-295, GR-227, GR-180 and GR-25 Heathkit color TV's.

Kit GRA-681-B, use with Heathkit GR-681 Color TV, 9 lbs.....\$64.95
Kit GRA-295-B, use with Heathkit GR-295 & GR-25 Color TV's 9 lbs.....\$69.95
Kit GRA-227-B, use with Heathkit GR-581, GR-481, GR-227 & GR-180 Color TV's, 8 lbs.....\$69.95



Kits On These 2 Pages Shipped REA or Motor Freight Only

Now Two Heathkit® Color TV's In The 227 Sq. Inch Size... Improved Circuitry... New Brighter Tube... Lower Prices



New Lower Price
Save \$20
on "581" or "227"

Now—The New, Improved GR-581 & GR-227 Have Sharper, Clearer Pictures... Plus The New Brighter Picture Tube... All This And Lower Prices Too! See Details Page 2

Features Common To Both "581" & "227" Models

• Top quality American brand color tube with 295 sq. inch viewing area, and anti-glare safety glass • New improved phosphors for brighter, livelier colors • 27 tube, 10 diode, 1 transistor circuit • 24,000 volt regulated picture power • Automatic degaussing & mobile degaussing coil • Exclusive built-in servicing aids • Dynamic pincushioning correction circuit eliminates picture edge distortion • Extra B+ boost for improved picture definition • 3-stage video IF strip reduces interference, improves reception • Exclusive Heath "Magna-Shield" improves color purity • Gated Automatic Gain Control (AGC) for steady, jitter-free pictures at all times • Automatic Color Control circuit reduces color fading • Deluxe VHF turret tuner with "memory" fine tuning and gold/niborium contacts • 2-speed transistor UHF tuner for both fast station selection and fine tuning individual channels • Two hi-fi sound outputs... a cathode follower for playing thru your hi-fi system and an 8 ohm output for connection to special contained-field 6" x 9" speaker • All critical circuits prebuilt & aligned • Two VHF antenna inputs... 300 ohm or 75 ohm • Circuit breaker protection • Optional wireless remote control can be added at any time • 2-year warranty on picture tube 90 days on all other parts

Advanced New Color Picture Tube. Recently announced by the leading manufacturers is color picture tube that is visibly brighter and gives better colors than previous tubes. This tube is now supplied at no extra cost. Exclusive Heath Magna-Shield... surrounds the entire picture tube to protect against stray magnetic fields and improve color purity. Automatic Degaussing "cleans" the picture everytime you turn the set on from a cold start.

Convergence Control Board... for fast, easy dynamic convergence secondary adjustment anytime you decide they are needed. Mounts behind "tilt-out" speaker.

Easy To Build! No special skills or knowledge needed. All critical circuits (VHF and UHF tuners, 3-stage IF assembly and high voltage power supply) are pre-built, aligned and tested at the factory. The assembly manual guides you the rest of the way with simple, non-technical instructions and giant pictorials. You can't miss.

Kit GR-295, all parts including chassis, tubes, mask, UHF & VHF tuners, and special extended-range 6" x 9" speaker, 131 lbs. (REA or motor frt.)... \$419.95

Kit GR-295MX, as above except with new "Hi-Lite" Matrix picture tube, 131 lbs.....\$429.95

GR-295 SPECIFICATIONS—Picture size: Rectangular viewing area approx. 295 sq. inches (23" diagonally, 20" horizontal, 16" vertical). Tube Size: 295 overall diagonal measurement. Deflection: Magnetic 90°. Focus: Electrostatic. Convergence: Magnetic & dynamic. Antenna input impedance: 300 ohm balanced, or 75 ohm unbalanced (VHF). Picture IF carrier frequency: 45.75 MHz. Sound IF carrier frequency: 41.25 MHz. Color subcarrier: 42.17 MHz. Video IF bandpass: 3.58 MHz. Sound IF frequency: 4.5 MHz. Tuning range: VHF channels 2-13, UHF channels 14-82. Sound cathode follower: Output impedance: 3 K. Frequency response: ±1 dB, 50-15,000 Hz. Harmonic distortion, less than 1%. Output voltage: 2 V. Audio output: Output impedance, 8 ohms. Output power, 2 watts. Frequency response, ±1 dB, 50-10,000 Hz. Harmonic distortion, less than 3%. Power requirements: 110-130 V., 60 Hertz AC, 330 watts. Chassis & Tube Dimensions Only: 20 1/2" H x 25 1/2" W x 19 1/2" D. Control panel assembly: 6 1/2" W x 7 1/2" H x 7" D. Required installation clearances are given in spec sheet & manual.

Choice Of Installation. Your new "581" or "227" will install in three different ways... put it in a wall for a really "custom looking" installation... or in any of the three handsome, factory assembled Heath cabinets on this page.

The "581" & "227" Have These Advanced Features To Insure Peak Performance... an improved low voltage power supply providing more B+ for better operation... automatic degaussing that demagnifies the set every time you turn it on from a cold start... the exclusive Heath Magna-Shield that surrounds the entire set to eliminate stray magnetic fields and maintain color purity... Gated Automatic Gain Control and an automatic color control circuit that reduce color fading and insure steady, jitter-free pictures... two VHF antenna inputs that accept either 300 ohm or 75 ohm lead-in from your antenna... two hi-fi sound outputs for listening thru the built-in 4x6" speaker or thru your own hi-fi system... easy assembly with the aid of the famous Heathkit manual and preassembled, prealigned VHF & UHF tuners, 3-stage IF assembly and high voltage power supply... vertical swing out chassis for fast, easy servicing... readily accessible convergence control board for quick picture "touch-up" anytime you feel it's necessary.

New "581" Includes Automatic Fine Tuning

In addition to all the standard Heathkit Color TV features mentioned above, the new "581" also includes Integrated Circuit AFT that eliminates manual fine tuning on all VHF/UHF channels. And it comes factory assembled & tested for even easier assembly.

Kit GR-581, all parts including chassis, tubes, mask, UHF & VHF tuners, AFT & special 4x6" speaker, 114 lbs. (REA or Motor Frt.) only \$399.95

Kit GR-227, all parts including chassis, tubes, mask, UHF & VHF tuners and special 4x6" speaker, 114 lbs. (REA or Motor Frt.)... only \$359.95

Kit GRA-227-B, wireless remote control, 8 lbs. \$69.95

GR-581 SPECIFICATIONS—Same as GR-227 below except with Automatic Fine Tuning on all VHF/UHF channels.

GR-227 SPECIFICATIONS—Picture size: Approx. 227 sq. in. rectangular. Deflection: Magnetic 90°. Focus: Electrostatic. Convergence: Magnetic & dynamic. Antenna input impedance: 300 ohm balanced, 75 ohm unbalanced VHF. Picture IF carrier frequency: 45.75 meg Hz. Sound IF carrier frequency: 41.25 meg Hz. Color subcarrier frequency: 42.17 meg Hz. Video IF bandpass frequency: 3.58 meg Hz. Sound IF frequency: 4.5 meg Hz. Tuning range: VHF channels 2-13 & UHF 14-83. Tube & diode complement: 27 tubes, 15 diodes, 2 transistors. Sound cathode follower: Output impedance 3K ohms, frequency response ±1 dB, 50-15,000 Hz. Harmonic distortion less than 1%, output voltage 2V. Audio output: Output impedance—8 ohms; output power—2 watts; frequency response—±1 dB, 50-10,000 Hz; harmonic distortion less than 3%. Power requirements: 110-130 V., 60 Hz AC 330 watts. Chassis & Tube Dimensions Only: 19 1/2" H x 27 1/2" W x 18" D. Required installation clearances are given in spec sheet & manual.

Exciting Mediterranean Oak Beautiful Mediterranean motif factory assembled and finished in luxurious oak. 40" W x 19 1/2" D x 29" H. Assembled GRA-227-2, 70 lbs.....\$109.95

Factory Assembled Cabinets For Your "581" Or "227" (New AC Interlock Provided)



Table Model TV Cabinet & Cart
Buy Both & Save \$4.95
Here's an attractive way to house your new "581" or "227". Use the handsome walnut-grain satin finish wood cabinet by itself... rubber feet protect your table... measures only 18 9/16" D x 29 11/16" W x 20 13/16" H. Or order the walnut-trimmed roll-around cart and enjoy portable convenience too.

GRA-227-3, stain-resistant cabinet, 45 lbs. \$39.95
GRA-227-4, roll-around cart, 18 lbs.... \$19.95
GRS-227-5, cart & cabinet combo, 63 lbs. \$54.95



Contemporary Walnut Cabinet
Factory assembled of fine furniture grade hardwoods and finished in rich walnut. Measures 31 3/4" W x 29 5/8" H x 19 1/2" D. Assembled GRA-227-1, 54 lbs.....\$64.95



Exciting Mediterranean Oak
Beautiful Mediterranean motif factory assembled and finished in luxurious oak. 40" W x 19 1/2" D x 29" H. Assembled GRA-227-2, 70 lbs.....\$109.95

Now Two Heathkit® Color TV's In The 180 Sq. Inch Size...With Improved Circuitry...New Brighter Tube...And Lower Prices

Factory-Assembled Cabinets For Your New "481" or "180" (New AC Interlock Provided)



Table Model TV Cabinet & Cart
Buy Together & Save \$4.95!
Handsome walnut-grained vinyl-clad wood cabinet . . . measures only 18 1/2" H x 27 1/2" W x 19 1/2" D with rubber feet.
GRA-180-3, cabinet only, 36 lbs. . . . \$27.50
Roll around cart has walnut-finished woods with "pale brass" accents.
GRA-180-4, cart only, 22 lbs. \$19.95
GRS-180-5, cart & cabinet combo, 58 lbs. \$42.50



Contemporary Walnut Cabinet
Has a beautiful oil-rubbed walnut finish.
Measures a compact 18 1/4" D x 28 1/4" W x 29" H.
Assembled GRA-180-1, 41 lbs.
(REA or motor freight) \$54.95



Deluxe Early American Cabinet
Factory assembled with a special combination of veneers and solids, finished in popular Salem-Maple. GR-180 speaker mounts on right side of 1-piece face mask.
Measures 18 1/4" D x 28 1/4" W x 31 3/4" H.
Assembled GRA-180-2, 48 lbs.
(REA or motor frt.) \$94.95

Reception Is Simulated
On All Sets Shown On This Page



Now As Low As
\$299.95



Now—New Improved Heathkit GR-481 & GR-180 . . .
Have Sharper, More Detailed Pictures . . . Plus New Brighter
Picture Tube . . . And Cost \$30 Less! See Details Page 2

Features Common To Both "481" & "180" Models

• Top quality American brand 180 sq. inch rectangular color tube with anti-glare safety glass • Rare earth phosphors plus smaller dot size for brighter, livelier color and better picture definition • 24,000 volt regulated picture power • Automatic degaussing • Exclusive Heath Magna-Shield covers entire tube to assure color purity at all times • Built-in servicing facilities to adjust and maintain set at peak performance • Automatic color control circuit to reduce color fading • Gated automatic gain control (AGC) for steady, flutter-free pictures • Extra B+ boost for improved picture definition • 2-speed transistor UHF tuner • Deluxe VHF turret tuner with "memory" fine tuning and gold/niborium contacts • 3-stage IF strip reduces interference, improves reception • Hi-fi sound output • Circuit breaker protection • Vertical swing-out chassis for easier servicing & installation in Heath cabinets • All critical circuits pre-wired and tested • New wireless remote control can be added at any time—a Heathkit exclusive • 2-year warranty on picture tube, 90 days on all other parts • Tubes alone list over \$245

Your Best Buy In Color TV. Both the "481" & "180" have the same high performance features as the "295" (see page 4) except for the 180 sq. in. rectangular picture tube.

New Improved Circuitry. The "481" & "180" have recent circuit improvements that provide increased video frequency bandwidth . . . deliver clearer, sharper, more detailed pictures.

Improved Color Picture Tube At No Extra Cost. This is the tube you've read and heard about. It gives brighter pictures, more vivid colors. It is now supplied at no extra cost.

Exclusive Heathkit Self-Servicing Features . . . the built-in dot generator plus full color pictures & instructions in the manual let you do the set-up, convergence and periodic touch-up when required.

Add Wireless Remote Control Anytime . . . only the unique Heathkit design lets you add wireless remote control at any time after purchase.

Three-Way Installation . . . install your new "481" or "180" in a wall or bookcase . . . in a favorite old B&W cabinet . . . or choose any of the smartly styled, factory assembled Heath cabinets on this page.

Advanced Features Insure Peak Performance. Like all Heath Color TV's, the "481" & "180" include

the exclusive Heath Magna-Shield that surrounds the picture tube to keep out stray magnetic fields that ruin color purity . . . automatic degaussing every time you turn your set on from a cold start . . . hi-fi sound output . . . two VHF antenna inputs . . . and much more.

Easy Assembly. All critical circuits come factory assembled & aligned.

Additional Features of the Heathkit "481" . . .

The new Heathkit "481" includes all of the standard features mentioned above plus Automatic Fine Tuning on all 82 UHF and VHF channels for perfect pictures always without having to manually fine tune each time you change channels . . . the state-of-the-art AFT module, using advanced Integrated Circuits, does it all. And the AFT module is factory assembled and aligned for even easier assembly.

Whichever model you choose . . . the "180" or "481", you can congratulate yourself on knowing a truly remarkable value. Order yours today.

Kit GR-481, all parts including chassis, tubes, mask, UHF & VHF tuners, AFT & special 4x6" speaker, 102 lbs. (REA or Motor Frt.) only \$329.95

Kit GR-180, all parts including chassis, tubes, mask, UHF & VHF tuners and special 4x6" speaker, 102 lbs. (REA or Motor Frt.) . . . only \$299.95

Kit GRA-227-6, Wireless remote control, 8 lbs. \$69.95

GR-481 SPECIFICATIONS—Same as GR-180 below except with Automatic Fine Tuning on all VHF/UHF channels and full wave bridge power supply.

GR-180 SPECIFICATIONS—Picture size: Rectangular viewing area approx. 180 sq. inches (18" diagonally, 16" horizontally, 12" vertically). Tube Size: 19" overall diagonal measurement. Deflection: Magnetic 90°. Focus: Electrostatic.

Convergence: Magnetic and Dynamic. Antenna Input Impedance: 300 ohm balanced, 75 ohm unbalanced VHF. Picture IF carrier frequency: 45.75 Meg. Hz. Sound IF carrier frequency: 41.25 Meg. Hz. Color subcarrier frequency: 42.17 Meg. Hz. Video IF bandpass frequency: 3.58 Meg. Hz. Sound IF frequency: 4.5 Meg. Hz. Tuning range: VHF channels 2-13 & UHF channels 14-83. Tube & Diode Complement: 27 tubes, 15 diodes, 2 transistors. Sound cathode follower: Output impedance 3K ohm, frequency response ± 1 dB, 50-15,000 Hz. Harmonic distortion less than 1%, output voltage 2V. Audio output: Output impedance—8 ohm; Output power—2 watts; Frequency response— ± 2 dB, 50-10,000 Hz. Harmonic distortion—less than 3%. Power requirements: 110-130 V., 60 Hz AC, 330 watts. Chassis & Tube Dimensions Only: 17 1/4" H x 25 1/2" W x 17 1/2" D. Required installation clearances are given in spec sheet & manual.

The New Heathkit® Stereo "Component Credenza" . . . A Masterpiece Of Sight And Sound



Lifting the spring-loaded hinged top reveals the neat control layout . . . with everything easily in reach from a standing position. A handy compartment in front holds a number of records.



The heart of the new "Component Credenza" is the Heathkit AR-14 FM-Stereo Receiver circuitry . . . judged first in value and performance by leading testing groups, hi-fi magazines and thousands of owners.



The BSR McDonald 500A Automatic Turntable, with many performance features usually found on more expensive units. Comes complete with a famous Shure diamond stylus magnetic cartridge.



The AD-19 houses two completely separate, ported speaker systems for reproduction comparable to that of systems using individual components.

Component Stereo In Elegant Oak Cabinetry . . . \$299.95

control compensates for unequal side-wall pressure that can ruin records and stylus . . . and to assure long record life and excellent fidelity, the AD-19 comes with a Shure diamond stylus magnetic cartridge.

Two Full Range Speaker Systems, housed in tuned-port enclosures on either end of the oak cabinet. Each system has a 10" high-compliance woofer for deep, rich bass and a ring-damped 3 1/2" tweeter that delivers clean, natural highs.

The Cabinet . . . would be worthy of a place in your home even if it didn't house such a remarkable sound system. It is a fine example of cabinetmaking art, styled in a Mediterranean motif and flawlessly executed in rich, dark oak veneer with all solid oak trim and decorative work. The top glides easily on spring-loaded hinges, and a handy compartment in the front stores records.

The New "Component Credenza" . . . a remarkable integration of quality stereo components in a cabinet of singular elegance. Easy, enjoyable 18-20 hour assembly with the famous Heathkit manual. Order yours now . . . it will make a fine addition to your home.

Kit AD-19, 158 lbs. \$299.95
Not Eligible For 5% System Discount.

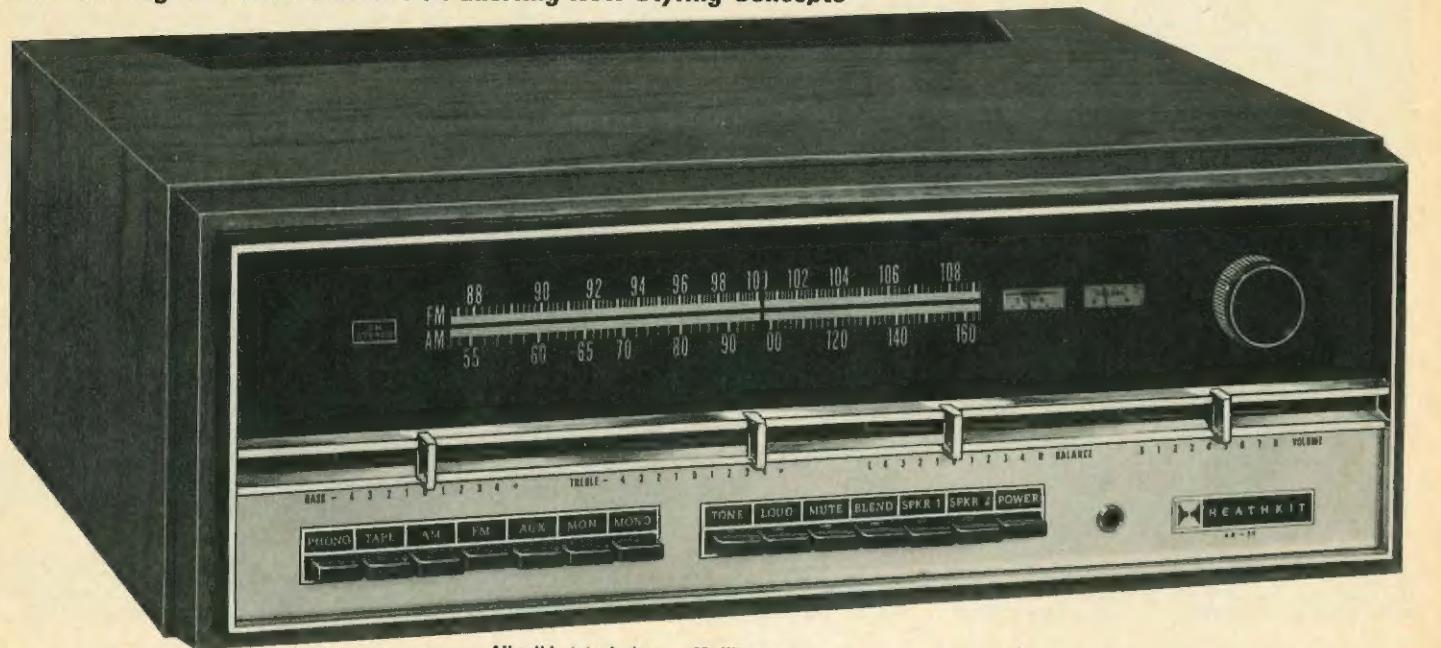
AD-19 PARTIAL SPECIFICATIONS—FM SECTION: Tuning Range: 88-108 MHz. Sensitivity: 5 μ V. Hum & Noise: ± 45 dB, 1 watt reference. Capture Ratio: 4 dB. Audio Frequency Response: Monophonic, 0 to ± 3 dB; 35-15,000 Hz. Harmonic Distortion: 1% or less. Separation: 27 dB @ 1 kHz. AMPLIFIER SECTION: IHF Music Power Output: 15 watts per channel. Continuous Power Output: 10 watts per channel. Frequency Response: (1 watt) 50-60,000 Hz ± 1 dB. Power Bandwidth: 12-90,000 Hz. Auxiliary Input Sensitivity: 300 mV. Auxiliary Input Impedance: 180 k ohms. Channel Separation: 45 dB or better @ 1 kHz. Total Harmonic Distortion: (at full output) Less than 1% from 12-60,000 Hz. Intermodulation Distortion: (at full output) Less than 1%. SPEAKERS: Frequency Response: 60-16,000 Hz. Crossover Frequency: 2 kHz.

AUTOMATIC TURNTABLE: Type: BSR McDonald 500A. Speeds: 16 2/3, 33 1/3, 45 and 78 RPM. Record Size: 7, 10 or 12". Phono Cartridge: Type: Shure M71 Magnetic. Stylus: 6 mil spherical diamond. Tracking Pressure: 1 1/2-3 grams. General: Power Requirements: 105-125 or 210-250 VAC, 50-60 Hz, 32 watts idling, 65 watts full output, plus 7.5 watts for automatic turntable motor. Dimensions: 49 1/2" W x 27" H x 20 1/2" D.

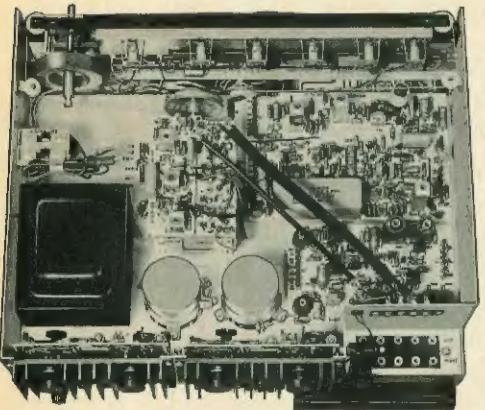


The New Heathkit® AR-29 100-Watt AM-FM-FM Stereo Receiver... \$285.00

The World's Finest Medium Power Stereo Receiver... Designed In The Tradition Of The Famous Heathkit AR-15... Advanced Field Effect Transistor And Integrated Circuit Design... Modular Plug-In Circuit Boards... Exciting New Styling Concepts

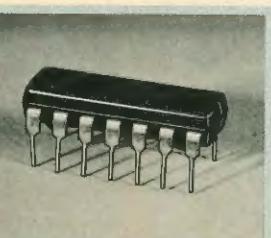
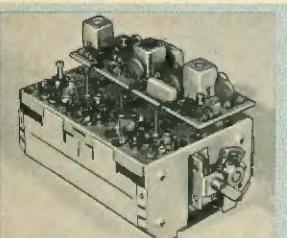


- All solid-state design... 65 silicon transistors, 42 diodes & 4 IC's containing another 56 transistors and 24 diodes.
- Assembled, aligned FET tuning unit... hypersensitive, free from overload.
- Computer designed L-C filter... a new advance in circuitry; fix-tuned, sealed factory assembled unit never needs alignment, gives steep flat-topped bandpass for highest selectivity.
- Ball-bearing flywheel tuning... just spin across the dial to your favorite station.
- Plug-in circuit boards... a first in kits... easy to build modular design.
- Built-in test circuit... test probes and meters combine to give you in-progress checks and service capability anytime.
- Massive power supply... loafs along at 100 watts... protected.
- Integrated Circuits... compress most of the elaborate IF and multiplex circuitry into 4 tiny solid-state devices.
- Recessed inputs & outputs... the cabinet fits flat against a wall.
- External AM & FM antenna inputs for your option.
- Transformerless outputs... for lowest distortion and phase shift characteristics.
- Linear Action Controls... just push left or right to the setting you desire for Volume, Bass, Treble, and Balance.
- Directional AM Rod Antenna... maximum signal for your favorite station.



"Black Magic" Panel Lighting

When not in use, the new AR-29 remains quietly distinctive... its impressive midnight black and chrome face reveals no dial or scale markings. A gentle press of the pushbutton power switch and the dial and scale markings appear. The "black magic" is in the unique dual tinted acrylic panel design.



Field Effect Solid-State FM Tuner... preassembled & aligned, delivers high sensitivity, low cross modulation & no overloading. AM RF board atop.

Computer Designed L-C Filter... gives IF alternate channel selectivity of more than 70 dB, optimum separation & minimum distortion. A first in kits from Heath.

Integrated Circuit Multiplex... this single tiny IC contains 31 transistors, 30 resistors & 10 diodes... performs four different functions.

Three Integrated Circuits in FM IF amplifier for hard limiting, temperature stability and increased reliability. Contain a total of 25 transistors, 14 diodes, and 24 resistors.

Two Calibrated Tuning Meters. Signal Strength meter indicates strongest signal... "Center Tune" puts you exactly on station frequency.

The New Heathkit AR-29... 100 Watts Music Power Output... Remarkable FM Performance... High Fidelity AM Reception... Built-In Self-Servicing Capability... An Extraordinary Musical Instrument

• All solid-state circuitry with 65 transistors, 42 diodes and 4 Integrated Circuits • 100 watts music power output at 8 ohms • 7-60,000 Hz frequency response • Less than 0.25% Harmonic & 0.2% IM Distortion at any power output • Transformerless, Direct-coupled outputs with dissipation-limiting circuitry for output protection • AM-FM-FM-Stereo Tuner features ball-bearing inertia flywheel tuning • Advanced L-C Filter for greater than 70 dB selectivity and elimination of IF alignment forever • Preassembled, factory-aligned FET FM Tuner for better than 1.8 uV sensitivity • Mute Control attenuates between-station noise on FM • Blend Control attenuates on-Stereo station noise on FM • SCA Filter • Linear Motion controls for Volume, Balance, Bass & Treble • Individually adjustable level controls for each channel of each input including tape monitor permits switching sources without annoying volume changes • Switches for 2 Separate Stereo speaker systems • Center speaker capability • Two front panel tuning meters for exact station selection • Stereo indicator light • Front panel stereo headphone jack • Swivel AM rod antenna for best signal pickup • 300 & 75 ohm FM antenna inputs • Tone Flat switch disables Bass & Treble controls for perfectly "flat" response • Massive, fully regulated power supply • New Heath modular plug-in circuit board design speeds assembly, aids servicing • Circuit board-wiring harness construction for fast, enjoyable kit building

Another Design Leader. The new Heathkit AR-29 reflects a heritage of solid-state engineering experience that could only come from the designers of the world famous Heathkit AR-15. The result of a two year project to produce the finest medium-power stereo receiver ever conceived, the introduction of the AR-29 marks another milestone in receiver design.

New Performance Standards For Stereo Amplifiers. The AR-29 houses what is undeniably one of the finest stereo amplifiers in any receiver. It delivers a full 100 watts of IHF music power, 70 watts continuous... enough to drive even inefficient speakers. A massive, fully regulated and filtered power supply, 4 individually heat-sinked output transistors and the best IM and Harmonic Distortion specifications in the industry combine to give the cleanest, most life-like sound you'll ever hear.

Short-Circuit Protection... a dissipation-limiting circuit protects the outputs from damage, even with a short circuit condition.

Input Level Controls... for both channels of all inputs including tape monitor allow adjustment of levels so volume remains constant when switching sources.

Clean, Sensitive FM-Stereo Reception. The preassembled, prealigned FM tuner has 1.8 uV sensitivity for real station pulling power, using FET design for superior overload characteristics. A tiny integrated circuit performs four different functions in the Multiplex section to assure excellent stereo performance. Three IC's in the IF section provide superior AM rejection capability, hard limiting, temperature stability and greater reliability.

New Computer Designed 9-Pole L-C Filter... in the IF strip gives ideally shaped bandpass with greater than 70 dB selectivity, superior separation and eliminates IF alignment forever. High "Q" toroid design gives better performance than ever possible with transformer type multi-stage IF's or single crystals. An exclusive in kits from Heath.

New "Blend" Function... attenuates any on-station FM hiss and high frequency noise at the push of a button.

New "Mute" Function... attenuates between-station noise on FM without affecting sensitivity of the tuner... just touch a button.

AM That Sounds Like FM. Three Field Effect Transistors in the AM RF circuits provide superior sensitivity with large signal handling capability for really remarkable AM reception. And the built-in AM rod antenna swivels so you can orient it for best reception.

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The World's Finest Stereo Components .. Heathkit® AR-15, AA-15 & AJ-15

Experts Agree The Heathkit AR-15 Is The World's Best Stereo Receiver

- 69 silicon transistors, 43 diodes, 2 integrated circuits • 150 watts music power • Automatic stereo switching • Automatic noise-operated FM squelch • Adjustable Phase Control • Automatic stereo indicator light • Stereo only switch to silence mono broadcasts • Individual front-panel input level controls for each channel of each source • Two stereo headphones jacks • Positive overload and short circuit protection • Easy circuit board construction

World's Most Sophisticated Features. Like integrated circuits and crystal filters in the IF amplifier section. The two IC's provide hard limiting, excellent temperature stability and increased reliability. Each IC is the size of a tiny transistor, yet contains 10 transistors, 11 resistors and 7 diodes. The crystal filters (another first in high fidelity from Heath) replace the usual transformers and provide an ideally shaped bandpass with steep skirts that offer a degree of adjacent channel selectivity not possible with conventional IF transformers. And since there are no coils, no alignment or adjustment is ever needed.

World's Most Sensitive FM Tuner . . . Exclusive With Heath. The special-design field effect transistor (FET) FM tuner consists of a cascode 2-stage FET RF amplifier and an FET mixer for high overload capability, excellent cross modulation and image rejection. The completely shielded tuner has a 4-gang variable capacitor and 6 tuned circuits for a selectivity of 70 dB even under the most adverse conditions. IHF sensitivity is 1.8 uv or better and harmonic and intermodulation distortion are both 0.5% or less.

World's Most Powerful Stereo Amplifier Section. The astounding 150 watts music power (100 watts RMS) is made possible by 4 conservatively rated, individually heat-sinked and protected output transistors powered by an unusually large power transformer and filter capacitor.

Positive Circuit Protection. You don't have to worry about damage from internal overloads or short circuits of any duration thanks to the 4 current-limiting Zener diodes and 2 temperature-sensitive circuit breakers that protect the driver and output transistors. A special Hi-Temp indicator shows when the thermal breakers have opened.

Other Features Include all-silicon transistor circuitry, stereo only switch, loudness switch for full response listening even at low levels, two calibrated tuning meters (signal strength & center-tune), noise-operated squelch to hush between-station noise before you hear it, stereo threshold control, adjustable phase control for best stereo, plus many more advanced features. Start enjoying the finest stereo listening with the AR-15.

Here's The Powerful Stereo Amplifier Section Of The Famous Heath AR-15 Receiver . . . Available Separately

If you already own a good stereo tuner, here's the amplifier to match it with . . . the amazing AA-15, featuring the same deluxe circuitry used in the famous Heathkit AR-15. 150 watts of Music Power are available to handle any music passage, and the ultra-wide range preamplifier (a 98 dB range) assures faithful reproduction, eliminates the possibility of overload. Harmonic and IM distortion are almost immeasurable . . . less than 0.2% at normal listening levels . . . less than 0.5% at full output on both channels. A 6 Hz to 30 kHz Power Bandwidth assures faithful reproduction of the original source, at any power level. A unique tone-flat switch allows you to bypass the tone control network for a completely flat response, and hidden secondary controls let you adjust the level of the incoming signal to be the same for any source. The

Here's The Superb FM Stereo Tuner Section Of The Famous Heath AR-15 Receiver . . . Available Separately

For the man who already owns a fine stereo amplifier, and in response to many requests, Heath now proudly offers the superb FM Stereo Tuner section of the famous AR-15 receiver. The new AJ-15 FM Stereo Tuner features the same exclusive design FET FM tuner with two FET r.f. amplifiers and FET mixer for best sensitivity, lowest cross modulation, lowest spurious response; the same exclusive design dual Crystal Filters in the I.F. strip for that perfectly shaped response curve with its degree of selectivity never-before achieved by any other . . . a design that gives you performance exceeding that of 8 I.F. transformers, yet it has none and never needs alignment; the same dual Integrated Circuit I.F. design for high gain, best limiting; elaborate Noise-Operated Squelch circuitry to hush between-station noise *before* you hear it; Stereo-Threshold switch to allow you to select the quality of stereo reception you will accept; Stereo-Only switch to allow you to silence all monophonic programs if you wish; Adjustable Multiplex Phase for cleanest, clearest FM stereo listening; two Tuning Meters, one for center tuning the station, one to indicate the maximum signal strength (also used during kit construction for adjustment of the 19 kHz pilot to max.). The same "Black Magic" panel lighting is used . . . no dial or control markings show when the tuner is turned off. In short, the new AJ-15 Stereo Tuner has all the fine FM tuning features of the AR-15 Receiver.

And it has new features . . . the cabinet is 2" shorter in depth to fit on a bookshelf more conveniently . . . the 3-position selector switch ("Mono" receives all stations but output is monophonic . . . "Auto" receives all stations

And now the AR-15 is eligible for the 5% System Discount . . . just order the AR-15 with any turntable and a pair of speakers and deduct 5% from the total price.

| | |
|--|----------|
| Kit AR-15 (less cabinet), 34 lbs. | \$349.95 |
| Assembled ARW-15 (less cabinet), 34 lbs. | \$540.00 |
| Assembled AE-16, 10 lbs., optional walnut cabinet. | \$24.95 |

AR-15 SPECIFICATIONS—Recommended system mates: All speakers & speaker systems, pp. 18 & 23; all changers & turntables, pp. 19-21. **AMPLIFIER SECTION:** Dynamic Power Output Per Channel (Music Power Rating): 8 ohm load; 75 watts. Continuous Power Output Per Channel*: 8 ohm load; 50 watts. **Power Bandwidth For Constant 0.5% Total Harmonic Distortion**: 6 Hz to 30 kHz. **Frequency Response** (1 watt level): ± 1 dB, 8 Hz to 40 kHz, ± 3 dB, 4 Hz to 80 kHz. **Harmonic Distortion**: Less than 0.5% from 20 Hz to 20 kHz at 50 watts output. Less than 0.2% at 1,000 Hz with 50 watts output. Less than 0.2% at 1,000 Hz with 1 watt output. **Intermodulation Distortion** (60 Hz, 6,000 Hz): Less than 0.5% with 50 watts output. Less than 0.2% with 1 watt output. **Damping Factor**: 45. **Input Sensitivity**: PHONO: 2.2 millivolts (overload 155 mv); TAPE: 200 millivolts (overload 4.5v). **AM**: 200 millivolts (overload 4.5v). **HUM & NOISE**: Volume control at minimum position: —80 dB PHONO; (10 millivolt reference); —60 dB. **TAPE & AUX**: (200 millivolt reference); —65 dB. **Channel Separation**: PHONO: 45 dB. **TAPE & AUX**: 55 dB. **Output Impedance** (each channel): 4, 8 & 16 ohms. **Tape Output Impedance**: 120 ohms. **Input Impedance**: PHONO: 51 k ohm (**RIAA equalized). **AUX**, **TAPE & TAPE MON**: 100 k ohm. **Tape Output**: 0.17 volt. **FM Section (Monophonic)**: **Tuning Range**: 88 to 108 MHz. **Intermediate Frequency**: 10.7 MHz. **Frequency Response**: ± 1 dB, 20 Hz to 15 kHz. **Antenna**: Balanced input for external 300 ohm antenna, unbalanced, 75 ohm. **Volume Sensitivity**: Below measurable level. **Sensitivity**: 70 dB. **Image Rejection**: 90 dB minimum*. **Capture Ratio**: 1.5 dB*. **AM Suppression**: 50 dB*. **Harmonic Distortion**: 0.5% or less*. **Intermodulation Distortion**: 0.5% or less*. **Hum & Noise**: 65 dB*. **Sensitivity**: 1.8 uv*. **Spurious Rejection**: 100 dB*. **FM Section (Sterophonic)**: **Channel Separation**: 40 dB or greater. **Frequency Response**: ± 1 dB, 20 Hz to 15 kHz. **Harmonic Distortion**: Less than 1% at 1,000 Hz with 100% modulation. **19 & 38 kHz Suppression**: 55 dB or greater. **SCA Suppression**: 50 dB. **AM Section**: **Tuning Range**: 535 to 1620 kHz. **Intermediate Frequency**: 455 kHz. **Sensitivity**: 12 microvolts at 1,000 kHz. **AM Antenna**: Built-in rod type, connection for external antenna. **Image Rejection**: 60 dB at 600 kHz, 40 dB at 1,400 kHz. **IF Rejection**: 70 dB at 1,000 kHz. **Harmonic Distortion**: Less than 1.5% at 400 Hz, 90% modulation. **Hum & Noise**: 45 dB. **GENERAL**: **Transistor & Diode Complement**: 69 transistors, 43 diodes & 2 integrated circuits. **Front Panel & Switches**: **AM & FM Tuning**: 535 to 1620 kHz and 88 to 108 MHz. **SOURCE Switch**: PHONO, AM, FM, TAPE & AUX. **Dual Tandem VOLUME Control**: **Dual Tandem BASS Control**: provides 15 dB boost and 17 dB cut at 20 Hz. **Dual Tandem TREBLE Control**: provides 15 dB boost and 15 dB cut at 20 kHz. The Bass and Treble controls can be disabled for FLAT frequency response. **BALANCE Control**, **SPEAKERS Switch**, **POWER Switch**, **MODE Switch**, **TAPE MON**, **Switch**, **FM Switch**, **NOISE FILTER Switch**, **LOUDNESS Switch**, **PHASE Control**, **SQUELCH Control**, **STEREO THRESH** (threshold) Control, **L & R AUX** Controls, **AM-FM Level Controls**, **PHONO Level Controls**, **TAPE Level Controls**, **TAPE MONITOR Level Controls**, **SEP**, **ADJ** (Separation Adjust) Control, 19 kHz Test-Adjust Switch, **SIGNAL Meter** V, R, **Normal Switch**. **AC Outlet Sockets**: Accessory outlets, rear chassis apron, one switched (350 watts maximum), and two unswitched (350 watts maximum). **Power Requirements**: 105-125 or 210-250 volt 50/60 Hz AC. **Dimensions**: Overall, 16 $\frac{1}{2}$ " wide x 4 $\frac{3}{4}$ " high x 14 $\frac{1}{2}$ " deep. *Rated IHF (Institute of High Fidelity) Standards. **RIAA (Record Industry Association of America).



Kit AR-15
\$349.95
(less cabinet)



"Black Magic" Panel Lighting On The Heathkit AR-15, AA-15 and AJ-15

When not in use, the AR-15, AA-15 and AJ-15 all remain quietly and beautifully unpretentious . . . the dial scale and nomenclature disappear and all that shows is a gleaming black panel and handsome anodized aluminum knobs. A touch of the power switch brings it to life and the dial and nomenclature appear in contrasting color. The "Black Magic" is in the unique tinted acrylic "dual-panel" design.



AA-15
\$179.95
(less cabinet)



A Speaker System
To Match The
AR-15 Series

Fits On A Bookshelf . . . Performs Like A Floor System
AS-38 On Page 18



All Kits On These 2 Pages Mailable

The Famous Heathkit® AA-14/AJ-14 Family of Solid-State Stereo Performers

Kit AR-14

\$119.95

(less cabinet)

Wired ARW-14

LAST CALL

\$149.95

(with cabinet)

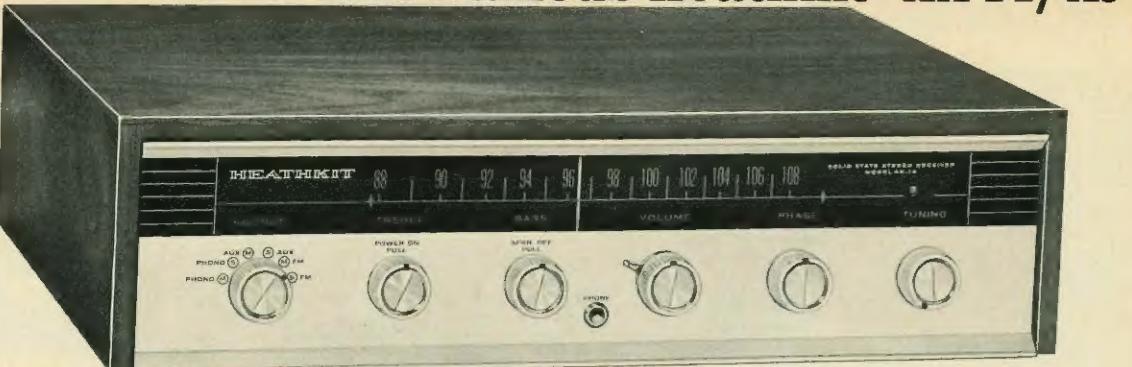
The Famous Heathkit AR-14 30-Watt FM Stereo Receiver

Available Kit Or Assembled

• All solid-state 31 transistor, 10 diode circuit for heat-free, trouble-free performance and longer life • Remarkable 15 to 50,000 Hz response ± 1 dB • 15 watts music power per channel • Very low Harmonic & IM distortion • Front panel stereo headphone jack for private listening • Adjustable phasing control for ideal stereo FM separation at all times • Stereo indicator light • Transformerless output circuit for lowest distortion, minimum phase shift and wider response • Circuit board-wiring harness construction for faster assembly with less chance of error • Measures only 3 $\frac{3}{8}$ " H x 15 $\frac{1}{4}$ " W x 12" D—ideal for bookshelf installation

America's Best Transistor Stereo Value now becomes an even better buy with the special 5% Heath stereo system discount. Just order the AR-14 with two speakers (see pgs. 18, 23), and subtract 5% from the total price! And what performance! Delivers 30 of the coolest watts you've ever heard. And the FM tuner pulls in stations far and near...you'll discover stations you've never heard before. For beat-free stereo taping the tuner outputs are filtered.

New Transformerless Output Circuit... for clear uncolored sound. Each channel has two complementary PNP and NPN transistors. This superior design delivers lower phase shift, minimum distortion and wider response. Other features include a stereo headphone jack for private listening; stereo indicator light; complete controls for full command of all functions; and choice of 3-way installation... wall, custom cabinet or either Heath factory-assembled walnut or beige metal cabinet. The attractive AR-14 anodized aluminum front panel looks great in any surroundings. Circuit board construction... build it in a weekend.



The Famous Heathkit AA-14/AJ-14 . . . Rated First In Value By Leading Testing Groups, High Fidelity Magazines & Electronics Editors



AJ-14
\$57.95

(less cabinet)



AA-14
\$67.95

(less cabinet)

The Famous AJ-14 FM Stereo Tuner . . . Concert Hall Realism At An Amazing Price

• 14-transistor, 5-diode circuitry for instant, heat-free operation and natural, transparent sound • 4-stage IF section delivers sensitivity and selectivity comparable to units costing much more • Stereo phase control for maximum separation and minimum distortion • Filtered outputs for direct "heat-free" stereo recording • Automatic Frequency Control for drift-free listening • Automatic stereo indicator light • Only 4 controls for simple operation-on-off, Tuning, Mono-Stereo & Phase • Pre-aligned, pre-assembled "front-end" tuner & one circuit board for fast, simple construction • Install any of three ways... wall, custom or either Heath Cabinet • Excellent team mate for the AA-14 stereo amplifier opposite

Kit AJ-14, 6 lbs., less cabinet for custom mounting **\$57.95**
Model AE-35, 4 lbs., beige metal cabinet **\$3.50**
Model AE-25, 4 lbs., genuine walnut veneer cabinet **\$9.95**

AJ-14 SPECIFICATIONS (RATED IHF STANDARDS)—Tuning range: 88 to 108 MHz. Antenna input impedance: 300 ohm, balanced input. Sensitivity (IHF): 5 microvolts. Intermediate frequency: 10.7 MHz. Audio frequency response (IHF): —3 dB to 0 dB (20 to 15,000 Hz). Hum and noise (IHF): —50 dB. Output impedance: 20 K ohm. Output voltage: 0.7 volt with a 1,000 microvolt input signal. 400 Hz with 100% modulation. Harmonic distortion (IHF): 1% or less. Image ratio (IHF): —45 dB. Capture ratio (IHF): 3 dB. IF rejection (IHF): —80 dB. AFC correction: 150 kHz per volt. AM suppression (IHF): —40 dB. Channel separation: 30 dB or more at 1,000 Hz. (Channel separation is measured using a 98 MHz, 1,000 microvolt input stereo signal that is 100% modulated.) Power requirements: 105-125 V, AC, 50-60 Hz, 20 watts idling; 60 watts full output. (No load on AC power socket.) Dimensions: With walnut cabinet 12 $\frac{1}{2}$ " W x 3 $\frac{1}{2}$ " H x 9 $\frac{1}{2}$ " D. Custom mounting dimensions: Horizontal or vertical, cutout required 11 $\frac{1}{4}$ " x 2 $\frac{1}{2}$ ", depth required from front of mounting surface 10 $\frac{1}{4}$ ".

Open Your Heath Account—No Money Down Up To \$300—Up To 18 Months To Pay—See Order Blank For Details



AD-27

\$179.95

Heathkit "27" Solid-State Component-Compact . . . With The Famous Heathkit AR-14 Stereo Receiver

The New Heathkit "27" Was Designed To Change Your Mind About Stereo Compact Performance... it sounds as if it were made from high quality stereo components... in fact it is. Heath engineers took the highly praised Heathkit AR-14 solid-state stereo receiver, modified it physically to fit the handsome walnut cabinet and combined it with the top performing BSR McDonald 500A Automatic Turntable. The result is stereo performance that is thoroughly impressive in every respect. The amplifier delivers an honest 15 watts per channel and has output impedances from 4 to 16 ohms—more than enough to drive any reasonably efficient speaker system (and there are some good ones on pp. 18, 23). Frequency response is virtually flat from 12 Hz to 60 kHz. The FM stereo tuner portion boasts 5 uV sensitivity and 27 dB channel separation. Harmonic & IM distortion throughout the system are both less than 1%. The BSR turntable has many performance features... cueing and pause control, counterbalanced aluminum tone arm, variable anti-skate control and comes with a famous Shure diamond stylus magnetic cartridge. Easy to build, a pleasure to listen to... the Heathkit "27" represents a remarkable value in stereo compacts. Order yours now.

Kit AD-27, 41 lbs. **\$179.95**

With its solid walnut sliding tambour door closed the AD-27 is a quietly impressive piece of furniture... and it will play with the door either open or closed.

• All solid-state circuitry • 15-watts per channel music power output • Virtually flat response • Full range tone controls • Low Harmonic & IM distortion • 45 dB channel separation • Tandem Volume, Balance, Bass & Treble Controls • Transformerless output circuit • Electronically filtered power supply • Stereo headphone jack • Auxiliary input • Filtered tape output • Excellent sensitivity & separation in the FM tuner section • Smooth inertia flywheel tuning • Stereo indicator light • 4 stage IF • Automatic Frequency Control • SCA Filter • Low hum and noise • Balanced 300 ohm antenna input • Low harmonic distortion • High quality BSR turntable features low mass counterbalanced tubular aluminum tone arm Shure diamond stylus magnetic cartridge • Plays all four speeds, manual or automatic • Vernier stylus pressure • Adjustable Anti-Skating Control • Cue-Pause Control • Beautiful oiled walnut cabinet with sliding tambour door that disappears inside cabinet • Can be operated with door closed or opened • Connections recessed in side of cabinet • Can be used as a room divider, bookshelf system, etc • Sufficient power to operate most speaker systems

AD-27 SPECIFICATIONS—Recommended System Mates: All speakers & speaker systems, pp. 18, 23. FM SECTION: Tuning range: 88-108 MHz. Antenna input impedance: 300 ohms, balanced input. Sensitivity: 5 uv.* Intermediate frequency (IF): 10.7 MHz. Hum & Noise: —45 dB, 1 watt reference. Audio frequency response: Mono: 0 to —3 dB from 20 to 15,000 Hz. Harmonic distortion: 1% or less.* Image rejection: —45 dB.* Capture ratio: 4 dB.* AFC Correction: 150 kHz per volt. AM Suppression: —35 dB.* IF Rejection: —80 dB.* Separation: 27 dB @ 1000 Hz. Amplifier Section: Continuous power output: 15 watts per channel. Music power output: 15 watts per channel.* Tape output: 0.5 volt, with a 0.3 volt signal at the AUX input. Speaker output impedance: 4 thru 16 ohms. Tape output impedance: 3500 ohms. Damping factor: 50 or higher. Hum & noise: Phono: —47 dB. Auxiliary: —60 dB. Frequency response: 1 watt: 12 Hz to 60 kHz ± 1 dB, 6 Hz to 100 kHz ± 3 dB. Power bandwidth: 5 Hz to 90 kHz. Input sensitivity: Aux, 300 millivolts. Channel Separation: 45 dB or better at 1000 Hz. Total Harmonic Distortion (at full output): Less than 1% from 12 Hz to 60 kHz. Intermodulation Distortion (at full output): Less than 1% using 60 & 6000 Hz mixed 4:1. Phone Equalization: RIAA (Recording Industry Assoc. of America). Bass: 16 dB cut & 15 boost @ 2000 Hz. Treble: 13 dB cut & 15 boost @ 20 Hz. Treble: 13 dB cut & 15 boost @ 2000 Hz. Automatic Turntable Type: BSR McDonald 500A. Turntable speeds: 16 $\frac{2}{3}$, 33 $\frac{1}{3}$, 45 & 78 rpm. Record size: 7", 10", or 12". Wow: Less than 0.2%. Flutter: Less than 0.6%. Cartridge type: Shure model M44-7. Stylus: 0.7 mil diamond. Tracking pressure: 1.5 to 3 grams. GENERAL: Power requirements: 105-125 or 210-250 volts, 50/60 Hz, 32 watts full output. Plus 7.5 watts from automatic turntable motor. Dimensions: Overall: 21 $\frac{1}{4}$ " W x 7 $\frac{1}{2}$ " H x 14-11/16" D. Net weight: 29 lbs.

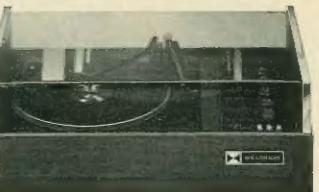
*Rated IHF (Institute of High Fidelity) Standards.



AD-17

\$109.95

To keep those favorite records clean and free from dust, order the attractive new protective cover. It's attractively styled in smoke gray see-through plastic with walnut sides to match the AD-17.



\$109.95

• 15 watts per channel music power output • All solid-state circuitry • Low Harmonic & IM distortion • Virtually flat frequency response • Full range Treble and Bass controls • 45 dB channel separation • Advanced transformerless output circuitry • Electronically filtered power supply • Auxiliary and tuner inputs • Headphone jack • Tape outputs • Precision-crafted BSR turntable features cueing and pause control • Adjustable stylus pressure • Adjustable anti-skate control • Plays all four speeds, manual or automatic • 4-pole induction motor for low wow & flutter • Handsomely styled cabinet • Circuit board plus wiring harness for easy assembly • Attractive new optional see-through cover adds extra beauty & protects valuable records from dust

Heathkit "17" . . . With The Famous AA-14 30-Watt Solid-State Stereo Amplifier And Optional Protective Cover

Quality Stereo Sound At A Budget-Saving Price. Heath engineers took the top rated AA-14 solid-state stereo amplifier, matched it with the precision BSR McDonald 400 Automatic Turntable, and put both these able performers in a handsome walnut cabinet. The 17 transistor, 6 diode amplifier delivers 15 watts music power per channel—more than ample to drive any reasonably efficient speaker system (see pp. 18, 23). Frequency response is a wide 12 Hz to 60 kHz ± 1 dB and harmonic & IM distortion are both less than 1% at full output. Wide range Volume, Bass, Treble & Balance controls give you full command and there's even a stereo headphone jack for private listening. Tuner and auxiliary inputs allow the addition of stereo FM and tape recording later if you wish. The BSR McDonald 400 Turntable incorporates many advanced design features... variable cueing and pause control, adjustable stylus pressure... anti-skate control... and comes equipped with a Shure magnetic cartridge. The 5% Heathkit System Discount makes the "17" an even more remarkable value. Order yours today.

Kit AD-17, 29 lbs. **\$109.95**
Model ADA-17-1, protective cover, 5 lbs. **\$12.95**

AD-17 SPECIFICATIONS—Recommended System Mates: All speakers & speaker systems, pp. 18, 23. AMPLIFIER SECTION: Continuous power output: 10 watts per channel. Music power output: 15 watts per channel.* Tape output: 0.5 volt, with a 0.3 volt signal at the AUX input. Speaker output impedance: 4 thru 16 ohms. Tape output impedance: 3500 ohms. Damping factor: 50 or higher. Hum & noise: Phono: —47 dB. Auxiliary: —60 dB. Frequency response: 1 watt: 12 Hz to 60 kHz ± 1 dB, 6 Hz to 100 kHz ± 3 dB. Power bandwidth: 5 Hz to 90 kHz. Input sensitivity: Aux, 300 millivolts. Channel Separation: 45 dB or better at 1000 Hz. Total Harmonic Distortion (at full output): Less than 1% using 60 & 6000 Hz mixed 4:1. Phone Equalization: RIAA (Recording Industry Assoc. of America). Bass: 16 dB cut & 15 boost @ 2000 Hz. Treble: 13 dB cut & 15 boost @ 20 Hz. Treble: 13 dB cut & 15 boost @ 2000 Hz. Automatic Turntable Type: BSR McDonald 400. Turntable speeds: 16 $\frac{2}{3}$, 33 $\frac{1}{3}$, 45 & 78 rpm. Record size: 7", 10", or 12". Wow: Less than 0.2%. Flutter: Less than 0.6%. Cartridge Type: Shure Magnetic. Stylus: 0.7 mil diamond. Tracking Pressure: 3 to 5 grams. GENERAL: Power Requirements: 105-125 or 210-250 volts, 50/60 Hz, 32 watts full output. Plus 7.5 watts from automatic turntable motor. Dimensions: Overall: 21 $\frac{1}{4}$ " W x 8 $\frac{1}{2}$ " H x 14-1/16" D. Net weight: 21 lbs.

*Rated IHF (Institute of High Fidelity) Standards.

Kit AD-27 Shipped REA or Motor Frt., All Others Mailable



Hear The Best Music Better...With These Receivers, Tuners and Amplifiers

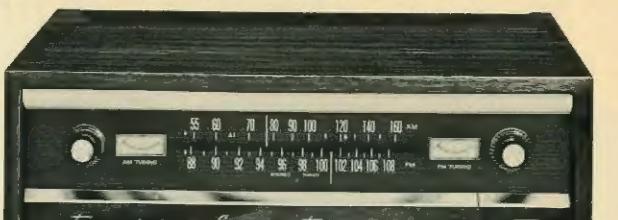
A AR-17

\$72.95



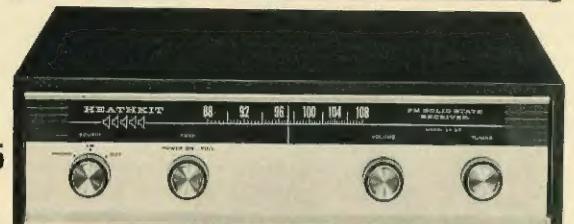
C AJ-43D

\$114.95



B AR-27

\$41.95



D AA-21D

\$139.95



A Heathkit AR-17 Solid-State FM-Stereo Receiver

Kit AR-17, 9 lbs. (less cabinet for custom mounting).....\$72.95
 Model AE-35, 4 lbs., beige metal cabinet.....\$3.50
 Model AE-25, 4 lbs., genuine walnut veneer cabinet.....\$9.95
AR-17 SPECIFICATIONS—Recommended system mates: All speakers & speaker systems except AS-38, ppg. 18 & 23, all changers & turntables, ppg. 19-21. **FM SECTION:** Tuning range: 88-108 MHz. Antenna input impedance: 300 ohm, Balanced input. Sensitivity: 5 microvolts*. Intermediate frequency (IF): 10.7 MHz. Hum & noise: -50 dB at 1 watt reference. Audio frequency response: Monophonic: 0 to -3 dB from 20 to 15,000 Hz. Harmonic distortion: 1% or less*. Image rejection: -40 dB*. Capture ratio: 3 dB*. AM suppression: -35 dB*. IF rejection: -80 dB*. Separation: 30 dB @ 1000 Hz. **AMPLIFIER SECTION:** Continuous power output: 5 watts per channel. Music power output: 7 watts per channel*. Speaker output impedance: 4 thru 16 ohms. Damping factor: 50 or higher. Hum & noise: Phono: 45 dB; Aux: 55 dB; Power Amplifier: 80 dB. Frequency response: (1 watt): 25 to 35,000 Hz ±1 dB; 15 to 70,000 Hz ±3 dB. Power response: (5 watt): 25 to 35,000 Hz ±1 dB; 15 to 70,000 Hz ±3 dB. Input sensitivity: Phono: 5 millivolts. Aux: 300 millivolts. Input impedance: Phono: 45K; Aux: 150K. Channel separation: 40 dB or better @ 1,000 Hz. Total harmonic distortion: (at 5 Watts): Less than 1% from 20 to 20,000 Hz. Intermodulation distortion: (at 5 watts): Less than 2% using 60 & 6000 Hz mixed 4:1. Phone equalization: RIAA (Recording Industry Assoc. of America). **GENERAL:** Transistor & diode complement: 28 transistors, 7 diodes. Power requirements: 105-125 volts or 210-250 volts, 50/60 Hz, 21 watts idling, 45 watts full output. Dimensions: Overall: 12" W x 3" H x 10 1/2" D. Mounting position: Horizontal or vertical. Custom mounting requirements: 11 1/4" x 2 1/2" cutout, 10" D. from front mounting surface. Net weight: 9 lbs. *Rated IHF (Institute of High Fidelity) Standards.

B Heathkit AR-27 Monophonic FM Receiver

Kit AR-27, 9 lbs. (less cabinet for custom mounting).....\$41.95
 Model AE-35, 4 lbs., beige metal cabinet.....\$3.50
 Model AE-25, 4 lbs., genuine walnut veneer cabinet.....\$9.95
AR-27 SPECIFICATIONS—Recommended system mates: Speaker Systems, AS-16, AS-37, AS-41, p. 34; AS-18, p. 18, Separate Speakers, AS-27, AS-183, AS-173, AS-163, AS-153, AS-133 & AS-123 p. 23. All Changers & Turntables, pp. 19-21. **FM SECTION:** Tuning range: 88-108 MHz. Antenna input impedance: 300 ohms, balanced input. Sensitivity: 5 microvolts*. Intermediate frequency (IF): 10.7 MHz. Hum & noise: -50 dB, 1 watt reference. Audio frequency response: 0 to -3 dB from 20 to 15,000 Hz. Harmonic distortion: 1% or less*. Image rejection: 40 dB*. Capture ratio: 3 dB*. AM suppression: -35 dB*. IF rejection: -80 dB*. **AMPLIFIER SECTION:** Continuous power output: 5 watts. Music power output: 7 watts. Speaker output impedance: 4 thru 16 ohms. Damping factor: 50 or higher. Hum & noise: Phono: 45 dB; Aux: 55 dB; Power Amplifier: 80 dB. Frequency response: (1 watt): 25 to 70,000 Hz ±1 dB; 15 to 120,000 Hz ±3 dB. Power response: (5 watt): 25 to 60,000 Hz ±1 dB; 15 to 100,000 Hz ±3 dB. Input sensitivity: Phono: 5 millivolts; Aux: 300 millivolts. Input impedance: Phono 45K ohms, Aux: 150K. Total harmonic distortion: (5 watts): less than 1% from 20 to 20,000 Hz. Intermodulation distortion: (5 watts): less than 2% using 60 and 6000 Hz mixed 4:1. Phone equalization: RIAA (Recording Industry Assoc. of America). **GENERAL:** Transistor complement: 13 transistors, Diode complement: 6 diodes. Power requirements: 105-125 V. or 210-240 V., 50/60 Hz, 23 watts full output, 11 watts idling. Dimensions: Overall: 12" W x 3" H x 10 1/2" D. Mounting positions: Horizontal or vertical. Custom mounting requirements: 11 1/4" x 2 1/2" cutout, 10" D. from front mounting surface. *Rated IHF (Institute of High Fidelity) Standards.

SAVE AN EXTRA 5% BY

ORDERING A SYSTEM

Here's How... (1) order a stereo amplifier and stereo program source (such as a tuner, turntable, GD-28 tape player) plus a pair of speaker systems; (2) a stereo receiver and a pair of speaker systems; (3) a stereo compact plus a pair of speaker systems. Order the complete system at the same time, and subtract 5% from the total price. (This system discount



Handy Stereo Accessories To Make Private Listening More Enjoyable

A Telex "Adjustatone" Stereo Headset

Model ADP-135, 2 lbs.....\$15.95

ADP-135 SPECIFICATIONS—Driver element: Dynamic. Frequency response: 10-15,000 Hz. Impedance: 3-16 ohm sources. Distortion: At Normal Listening Levels, less than 1%. Cord length: 8 ft. 4-wire with 3-circuit phone plug.

B Telex ST-11 Stereo Headset

Model ADP-92, 2 lbs.....\$23.92

ADP-92 SPECIFICATIONS—Driver elements: Dynamic. Frequency response: 16 to 15,000 Hz. Impedance: 3 to 16 ohm sources. Distortion: At Normal Listening Level less than 1%. Cord: 4-wire 12 ft. long with 3-circuit phone plug. Color: Tan & Brown.

C KOSS "Pro" Stereo Headset

Model ADP-137, 2 lbs.....\$49.00

ADP-137 SPECIFICATIONS—Driver element: Dynamic. Frequency response: 30-20,000 Hz. Impedance: 4 to 16 ohm sources. Distortion: Less than 1% of max. output. Cord: Coiled, 10', 4-wire, 3-circuit plug. Color: Gray-bronze cups, black cushions & band.

D Heathkit Stereo Headphone Control Unit

Kit AC-17, 3 lbs.....\$7.95

AC-17 SPECIFICATIONS—Output: 2-three connector phone jacks. Controls: Dual concentric level control, speaker-headphone selector switch. Recommended headphone impedance: 4 ohm or more. Dimensions: 3" W x 4" D x 2 1/2" H including control knobs. Cable length: 20 ft.



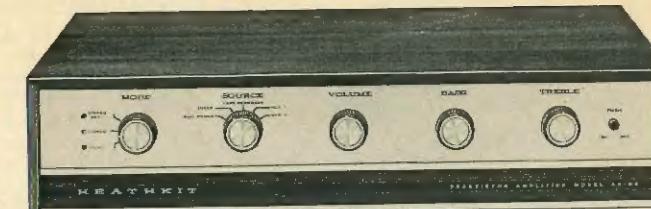
AJ-33A \$99.95

Deluxe AM/FM Stereo Tuner

• 23-transistor, 8 diode circuit • Automatic stereo switching • Stereo phase control for lowest distortion, maximum separation • Stereo indicator light • Filtered stereo outputs for beat-free taping • Pre-assembled, pre-aligned front end and IF circuits for maximum performance, easier assembly • Adjustable FM squelch quiet between-station noise • AFC for drift-free FM • AGC for steady volume • Flywheel tuning, lighted slide-rule dial & tuning meter for precision tuning • Walnut cabinet included

Kit AJ-33A, 18 lbs.....\$99.95

AJ-33A SPECIFICATIONS—**FM SECTION:** Tuning range: 88 to 108 MHz. Intermediate frequency: 10.7 MHz. Antenna: 300 ohm balanced or built-in line type. Output impedance (emitter follower): Variable to 3000 ohms. Output voltage: 1.5 volts. Quietling sensitivity: 2 uv for 20 dB; 3 uv for 30 dB. Audio frequency response: 20-15,000 Hz ±3 dB. Harmonic distortion: Less than 1%. Image rejection: 35 dB. Capture ratio: 3 dB. AM suppression: 35 dB. **MUX SECTION:** Converter bandpass: ±1/4 dB 50 to 53,000 Hz. Channel separation: 30 dB from 50 to 2 kHz and 25 dB at 10 kHz. **AM SECTION:** Tuning range: 535 to 1620 kHz. Intermediate frequency: 455 kHz. Usable sensitivity: 8 uv @ 1000 kHz. Antenna: Built-in rod with provision for external straight wire. Output voltage: 0.25 V. with 90% modulation. Image rejection: 40 dB @ 600 kHz. Harmonic distortion: Less than 2% (30% mod. @ 1 mv input). Hum & noise: 50 dB. **GENERAL SPECIFICATIONS:** Tuning indicator: Meter. Controls: Tuning, Right Channel level; Left Channel level; FM squelch; Stereo converter balance, separation and phase. Switches: Mode, AFC, Noise filter, SCA filter, local-distance. Transistors & diodes: 23 transistors, 8 diodes. Power supply: Transformer operated, full wave rectifier. Power requirements: 105-125 volts, 50/60 Hz, 7 watts. Dimensions: 15 1/2" W x 3 1/4" H x 11 1/2" D.



AA-22 \$99.95

Matching Solid-State 66-Watt Stereo Amplifier

• 20-transistor, 10 diode circuit for cool, crisp sound • 33 watts per channel music power output • Wide-range response 15 Hz to 30 kHz ±1 dB • Less than 1% distortion • 5 stereo inputs for any program source • Concealed secondary controls behind hinged lower front panel • Styling and performance companion to the Heathkit AJ-33A AM/FM Stereo Tuner

Kit AA-22, 22 lbs.....\$99.95



AA-18 \$19.95

Low Cost Solid-State 4-Watt Mono Amplifier Kit

• Wide frequency response • Low distortion • 4-watt output • Front panel headphone jack • Accepts ceramic phono cartridge, AM or FM mono tuner or tape recorder input

Kit AA-18, 4 lbs.....\$19.95

AA-18 SPECIFICATIONS—Dynamic Power Output: 4 watts.* Continuous power output: 3.25 watts.* Output impedance: 4 to 16 ohms. Input sensitivity: 250 millivolts. Input impedance: 125K ohms. Hum and noise: -65 dB. Treble cut: -22 dB at 15 kHz. Power bandwidth for constant 1.5% total harmonic distortion: 20 Hz to 100 kHz. Harmonic distortion: Less than 1.5% from 40 Hz to 60 kHz at 4 watts output. Less than 0.7% from 20 Hz to 60 kHz at 1 watt output. **Intermodulation distortion:** (For 35 watts output per channel, 8 ohm load) Tapehead, 2 mv, Mag. phono, 3 mv; Tuner, 250 mv; FM Stereo, 250 mv; Aux., 250 mv; Tape Monitor, 6.0 V. **Input impedance:** Tapehead, 60 K ohm; Mag. phono, 30 K ohm; Tuner, 100 K ohm; FM Stereo, 100 K ohm; Aux., 100 K ohm; Tape monitor, 47 K ohm. **Outputs:** 4, 8 or 16 ohms and low impedance tape recorder outputs. **Controls:** 5-pos. Selector (dual concentric), 5-pos. Mode switch, dual-concentric Volume, Bass & Treble controls, Tape monitor sw., Loudness sw., Phase sw., Input level controls (all inputs except Tape Head & Tape Monitor inputs), Push-Push on/off switch. **Semi-conductor complement:** 26 Transistors, 10 diodes. **Power requirements:** 105-125 or 210-250 volts, 50/60 Hz AC. 35 watts idling, no signal; 200 watts, full power out @ 120 volts with no load on AC receptacles. **Power outlets:** 2 AC receptacles, 1 switched, 1 unswitched. **Dimensions:** 15 1/2" W x 5 1/4" H x 14" D.

AA-32 Modestly Priced 20-Watt Stereo Amplifier

• 10 watts per channel music power output • Inputs for magnetic & ceramic cartridges, tuner & auxiliary • Full-range controls • Handsomely styled in mocha brown and beige with black trim • 115 or 230 VAC, 50-60 Hz operation **Kit AA-32, 16 lbs.....\$39.95**

AA-32 SPECIFICATIONS—Recommended system mates: Speakers: AS-163, AS-133 & AS-123, pg. 23. Speaker Systems: AS-16, AS-38, AS-10, AS-37 p. 18. All Changers & Turntables, pg. 19-21. **Simultaneous power output per channel:** 8 watts (16 watts total). **Frequency response:** ±1 dB from 30 Hz to 30,000 Hz at rated output. **Harmonic distortion:** (at rated output) 2% @ 30 Hz; 0.7% @ 1000 Hz; 2% @ 15,000 Hz. **Intermodulation distortion:** (at rated output) Less than 3% using 60 and 6000 Hz mixed 4:1. **Dimensions:** 13 1/2" W x 4 3/4" H x 9 1/2" D.



NEW Kit GD-28 \$59.95



40 Minute Stereo Cartridge
Included with your new GD-28. Features 16 instrumentals played by world famous Capitol Records recording artists. A \$7.95 value!

The Perfect Addition To Any Home Music System. The new Heathkit GD-28 Stereo Tape Player is designed to play back pre-recorded 8-track stereo tape cartridges through your present music system. Just plug it into the "Tape", "Tuner" or "Auxiliary" inputs of your amplifier. Its ease of operation and good reproduction make it an ideal background music source for home or office. An easy way to get extra enjoyment out of the stereo tape cartridges you use in your auto stereo system too.

Simple Operation. The new GD-28 is fully automatic... just plug in the cartridge of your choice and listen... a metal tape splice switches the playhead from one track to the next automatically. Or you can select the track you want to hear by just pushing the convenient slide switch... a pilot lamp indicates at a glance which track is playing.

Fast, Easy Assembly... the all solid-state 6-transistor, 2-diode preamplifier circuit goes together quickly on one small circuit board, and the tape player mechanism by Motorola® is preassembled and adjusted to make your kit building even easier. Total assembly time is about six hours. Comes complete with all necessary connecting cables too. And the smart looking, walnut grained vinyl clad wood cabinet and gold front panel included with the kit blends with any decor. Add the sound of 8-track stereo tape cartridges to your home music system soon... with the new Heathkit GD-28.

Kit GD-28, 10 lbs.....\$59.95

GD-28 SPECIFICATIONS—Cartridge: 8-track stereo. Tape speed: 3 1/4" per second. Output (each channel): 300 mV at Standard Reference Level. Harmonic distortion: Less than 3%. Separation: Greater than 30 dB at 1 kHz. Frequency response: ±6 dB, 50 Hz to 10 kHz. Wow & flutter: Less than 0.3%. Hum & noise: Better than -40 dB. Motor: 117 VAC synchronous. Power requirements: 105-125 VAC, 60 Hz, 45 watts (momentary). Cabinet: Simulated walnut grained vinyl clad wood. Dimensions: 10 1/4" W x 4 1/4" H x 8 1/4" D. Net weight: 6 1/4 lbs.

Speaker Systems—High Performance Per Dollar



AS-38

\$129.95

Outstanding Value! 12" System With Custom-Designed JBL® Speakers

- Features two JBL custom designed speakers—12" woofer with 6 1/4 lb. magnet assembly and 2" direct radiator tweeter with 1 1/4 lb. magnet assembly • Wide 45 Hz to 20 kHz response • High efficiency • Handles up to 40 watts program material • High frequency variable level control • Handsome walnut cabinet with removable speaker grille

The Heathkit AS-38 is so efficient it can be matched with receivers or amplifiers with as little as 7 watts output. At the other extreme, it does justice to as much as 40 watts... and is designed for use with the finest of stereo components. A high frequency level control on the back of the fine walnut finish cabinet lets you modify the sound to room acoustics. The one-piece, assembled cabinet is tube ported and all mounting is from the front for an air-tight seal. Putting the AS-38 together is simple; just wire the 2500 Hz LC-type crossover and the level control and mount the two speakers.

Kit AS-38, 49 lbs.

\$129.95

AS-31 SPECIFICATIONS—Recommended amplifiers: AR-19, pg. 8; AR-29, pg. 10; AA-14, pg. 14; AA-15, pg. 13; AA-21D, pg. 16; AR-14, pg. 14; AR-15, pg. 12; AA-22, pg. 17. Speakers: 12" woofer, 6 1/4 lb. magnet assy.; 2" piston-type direct radiator tweeter, 1.25 lb. magnet assy. Frequency range: 45 Hz to 20 kHz. Crossover: LC type 2500 Hz. Power rating: 40 watts program material. Impedance: 8 ohms. Controls: High Frequency Level. Cabinet: Damped reflex, tube-ported. Walnut veneer and furniture grade hardwoods, oiled finish. Dimensions: 14" H x 23 1/2" W x 11 1/4" D. Net Weight: 37 lbs.

Heathkit Acoustic Suspension System with Wide Response

- 10" acoustic suspension woofer extends bass response down to 30 Hz • Two 3 1/2" cone-type tweeters for high frequency response up to 15,000 Hz • Takes only 10 watts to drive, yet handles up to 40 watts
- High frequency level control • Preassembled cabinet in two finishes • Easy to build—just wire crossover network, install speakers • Versatile—installs vertically or horizontally

Kit AS-10U, unfinished, 43 lbs.

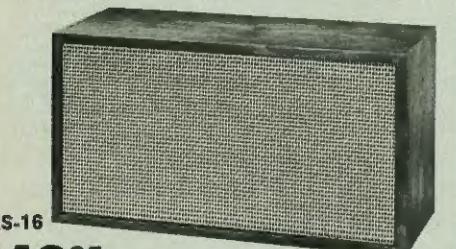
\$59.95

Kit AS-10W, walnut, 42 lbs.

\$64.95



\$59.95 AS-10U



AS-16

\$49.95



AS-18

\$34.95



AS-37A

\$41.95

Lowest Cost Speaker System

- 70-12,000 Hz response • 6 x 9" extended range speaker • Handles up to 12 watts of program material • Ideal as an extension speaker or center fill-in for stereo system
- Easy assembly • Unfinished or walnut

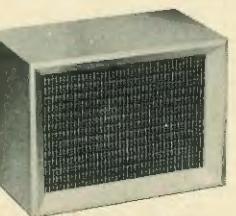
Kit AS-41U, unfinished, 8 lbs.

\$10.95

Kit AS-41W, walnut, 8 lbs.

\$12.95

AS-41 SPECIFICATIONS—Recommended amplifiers: AR-14, p. 14; AA-14, p. 14; AA-32, p. 17. Frequency response: 70 to 12,000 Hz. Impedance: 8 ohms. Capacity: 12 watts. Enclosure: Rear vented box. Speaker: 6" x 9" extended range dual cone, 6.8 oz. Alnico 5 magnet. Cabinet: Factory assembled, furniture-grade 1/2" plywood. Dimensions: 8" H x 11" W x 6 1/2" D.



AS-41U

\$10.95



AS-81U

\$17.50

The Space-Problem Solver

- 2-way system—6" woofer & 3" tweeter
- Wide 70-12 kHz range • Fast assembly
- Unfinished or walnut cabinets

Kit AS-81U, unfinished, 10 lbs.

\$17.50

Kit AS-81W, walnut, 10 lbs.

\$19.95

AS-81 SPECIFICATIONS—Recommended amplifiers: AR-14, pg. 14; AA-14, pg. 14; AA-32, pg. 17. Frequency response: From 70 to 12,000 Hz. Crossover frequency: 4000 Hz. Recommended amplifier power: 6 watts. Nominal impedance: 8 ohms. Cabinet: Type: infinite. Speakers: Tweeter, 3" cone type, 8 ohms, .53 oz. Alnico 5 magnet; Woofer, 5 1/2" cone type, 10 oz. Syntex No. 6 magnet. Crossover: Capacitor type. Dimensions: 10 1/4" W x 6 1/2" H x 6-3/16" D. Material: 1/2" veneer plywood.

NEW Heath/BSR McDonald Automatic Turntables

A New AD-139 Heath/BSR McDonald Automatic Turntable With Power Base, Shure Cartridge & Deluxe Dust Cover

- Factory assembled and tested—no assembly necessary... just connect to your stereo system • Plays all four speeds automatically, semi-automatically or manually with interchangeable center spindles • Cueing and Pause Control—ideal for tape recording • Adjustable Anti-Skate Control eliminates distortion caused by unequal side wall stylus pressure • Micrometer Stylus Pressure Adjustment for best tracking • Adjustable Vernier Counterweight for sensitive, accurate tracking • Low mass tubular aluminum tone arm balanced horizontally and vertically • Heavy cast, non-magnetic platter for maximum record support • 4-pole induction motor for constant speed and for very low rumble, wow & hum • Spring suspension minimizes external shock • 45 RPM adapter included • Automatic system shut-off with the Power Base • Stereo Muting Switch gives complete silence during change cycle • Handsomely styled in satin black with aluminum trim • Comes complete with automatic turntable, power base, dust cover, Shure cartridge and all connecting cables

Model AD-139, 11 lbs.



A AD-139
\$79.95

AD-139 SPECIFICATIONS: Speeds: 78, 45, 33 1/3 and 16 2/3 RPM. Motor: 4-pole hum-shielded induction type. Tracking: Tracks per cartridge specifications. Cartridge: Shure, elliptical stylus; 1 1/2-3 grams stylus pressure. Color: Satin black with aluminum trim. Cables Furnished: 6-foot UL approved line cord; 2 4-foot twin shielded audio cables. Power Requirements: 105-130 VAC, 60 Hz. Dimensions: (includes dust cover and base) 15 1/4" W x 13-3/16" D x 7 1/4" H.

B New AD-129 Heath/BSR McDonald 4-Speed Automatic Turntable . . .

Complete With Base, Shure Cartridge And Dust Cover

- Plays all four speeds manually, semi-automatically or automatically with interchangeable spindles supplied • 45 RPM adapter also included • Low mass tubular aluminum tone arm with vertical and horizontal counterbalancing
- Adjustable Vernier Counterbalance • Micrometer Stylus Pressure Adjustment—0-6 grams in 1/2 gram steps • Continuously variable Anti-Skate Control
- Dynamically balanced 4-pole induction motor for exact speed control and minimum wow and rumble • Full size deep drawn turntable with brushed aluminum trim ring • Cueing and Pause Control • Spring suspension minimizes shocks • Smartly styled in satin black with aluminum trim • Comes complete with automatic turntable, Shure cartridge, base, dust cover and all connecting cables

Model AD-129, 10 lbs.



B AD-129
\$59.95

AD-129 SPECIFICATIONS: Speeds: 78, 45, 33 1/3 and 16 2/3 RPM. Motor: 4-pole hum-shielded induction type. Tracking: Tracks per cartridge specifications. Cartridge: Shure, spherical stylus; 3-5 grams stylus pressure. Color: Satin black with aluminum trim. Cables Furnished: 6-foot UL approved line cord; 2 4-foot twin shielded audio cables. Power Requirements: 105-130 VAC, 60 Hz. Dimensions: (including dust cover and base) 15 1/4" W x 13-3/16" D x 7 1/4" H.

C New AD-119 Heath/BSR McDonald 4-Speed Automatic Turntable . . .

A Complete, Ready To Play Package At Low Cost

- Manual, automatic or semi-automatic play of all 78, 45, 33 1/3 and 16 2/3 RPM records • Accepts 7, 10 or 12" sizes • Low mass tubular aluminum counterweighted tone arm • Stylus pressure adjustment • Built-in cueing and pause control • Full size deep drawn platter for ideal record support
- Spring suspension minimizes shocks • Hum-shielded 4-pole induction motor for accurate speed and low wow, rumble and hum • Adjustable dynamic anti-skate control • Pop filter eliminates annoying "pop" when unit is shut off
- Comes ready to play with famous Shure cartridge, dust cover, base, 45 RPM spindle and all cables

Model AD-119, 10 lbs.



C AD-119
\$49.95

AD-119 SPECIFICATIONS: Speeds: 78, 45, 33 1/3 and 16 2/3 RPM. Motor: 4-pole hum-shielded induction type. Tracking: Tracks per cartridge specifications. Cartridge: Shure, spherical stylus; 3-5 grams stylus pressure. Color: Satin black with aluminum trim. Cables Furnished: 6-foot UL approved line cord; 2 4-foot twin shielded audio cables. Power Requirements: 105-130 VAC, 60 Hz. Dimensions: (including dust cover and base) 15 1/4" W x 13-3/16" D x 7 1/4" H.

MAESTRO 4-Speed Automatic Stereo Changer . . .

High Performance At Low Cost

- Same high-quality changer as used in the Heathkit GD-107 phonograph
- Ideal for low-cost music systems and for replacement uses • Use with amplifiers having ceramic cartridge inputs • Complete instructions for conversion to magnetic cartridge inputs • Manual or automatic play of any size 78, 45, 33 1/3 and 16 rpm records • Ceramic cartridge has diamond stylus for LP's, sapphire for 78's • Cartridge comes wired for stereo, can be rewired for mono • Beautifully styled walnut-grained vinyl-covered wood base
- Measures 23 1/4" H x 14 3/4" W x 12 1/2" D overall • Includes two 3' audio cables
- 45 rpm spindle adapter included • Completely assembled

GD-187, 12 lbs.



GD-187
\$29.95

GD-187 SPECIFICATIONS—Changer: Type, Maestro Model 52-93. Speeds: 16, 33 1/3, 45 and 78 rpm. Record sizes: 7", 10" and 12". Cartridge: Stereo ceramic. Stylus: 0.7 mil diamond for LP's, 3 mil sapphire for 78's. Power requirements: 105-125 V., 60 Hz AC. 10 watts.

Famous Garrard® And Dual® Turntables For 1970



ADP-89
(less cartridge & base)
\$129.50

New Garrard SL95B 3-Speed Automatic Transcription Turntable With Synchro-Lab Motor . . . Garrard's Finest

• Synchro-Lab motor for precise turntable speed • Automatic or manual play of 78, 45 & 33½ RPM speeds with interchangeable center spindles • Manual spindle rotates with record . . . reduces center hole wear • 12" aluminum turntable with anti-static mat and safety grooves • Low mass dynamically balanced wood/aluminum tone arm with gyroscopically gimballed pivots for minimal friction • Stylus pressure adjustment calibrated in exact ¼ gram increments . . . viewed through window in top of arm • Adjustable anti-skating control utilizing Garrard's patented sliding weight design • Counterweight adjustment screw permits ultra-fine arm balance • Garrard's exclusive two-point record support system for automatic play • Viscous damped cueing/pause control • Damped set-down of arm in automatic play • Slide-in cartridge clip • Combined record size and speed selector • Tracks and trips as low as ¼ gram • Choose either Heath 1c or \$5 cartridge option for extra value

Garrard's Finest . . . the new SL95B 3-speed automatic turntable. Designed for the serious audiophile, the new SL95B incorporates many improved performance features . . . viscous damped cueing/pause activated by a single control . . . new damped set-down of tonearm in automatic play . . . the easiest to use and most visible stylus pressure gauge of any automatic turntable . . . Garrard's patented sliding weight design anti-skate control . . . new counterweight adjustment for exact balance. Put this fine example of British craftsmanship in your stereo system now. And take advantage of the special Heath cartridge options.

ADP-89, turntable only (Garrard SL95B) 13 lbs. \$129.50
ADA-47-3, Power-Matic base, (Garrard B2P), 3 lbs. \$15.95
ADA-47-1, Coordinated base, simulated leather Ebony (Garrard B2), 3 lbs. \$6.50
ADA-47-4, dust cover, for use only with ADA-47-1, (Garrard D2), 4 lbs. \$6.50
ADA-57-2, 45 RPM spindle (Garrard LRS25), 1 lb. \$3.80

ADP-89 SPECIFICATIONS: Speeds: 33½, 45, & 78 RPM. Motor: Synchro-Lab. Tracking: Tracks per cartridge specifications. Color: Ebony with aluminum trim. Wiring: Stereo, 4-pin/5-wire system with separate ground connection for hum elimination. Cables Furnished: Line cord, 2 audio cables. Power Requirements: 100-130 volts, 60 Hz AC. Dimensions: 15-13-16" W. x 14" D. x 4½" above, 3" below motor board.

| Cartridge Options for ADP-89 & ADP-79 . . . Limit one per turntable order. Specify Heath model number— | | | |
|--|---|--|---|
| 1c | Heath AD-36N Pickering V-15/ATE-3 Reg. \$39.95 | Heath AD-58R Shure M93E Reg. \$39.95 | Heath AD-96H Empire 888E Reg. \$39.95 |
| \$5 | Heath AD-78A Pickering V-15/AME-3 Reg. \$49.95 | Heath AD-68F Shure M91E Reg. \$49.95 | Heath AD-88C Empire 888E Reg. \$49.95 |



ADP-79
\$89.50
(less cartridge & base)

Garrard's Newest 3-Speed Automatic Transcription Turntable . . . the SL 72B . . . High Performance Features At A Moderate Price

• Automatic or manual play of all three speeds with interchangeable center spindles • Famous Synchro-Lab motor for perfectly constant speed • Low mass tubular aluminum tone arm floats within a cast gimbal mounting • Adjustable counterweight • Adjustable stylus pressure gauge • Permanently accurate sliding weight anti-skate control • Viscous damped cueing/pause control • Damped tonearm set-down in automatic play • Special cartridge options

ADP-79, turntable only, (Garrard SL72B) 13 lbs. \$89.50
ADA-47-3, Power-Matic base, (Garrard B2P), 3 lbs. \$15.95
ADA-47-1, Coordinated base, simulated leather & ebony (Garrard B2), 3 lbs. \$6.50
ADA-47-4, Dust cover, for use only with ADA-47-1, (Garrard D2), 4 lbs. \$6.50
ADA-57-2, 45 RPM spindle (Garrard LRS25), 1 lb. \$3.80

ADP-79 SPECIFICATIONS: Same as ADP-89 above.

| NEW! Cartridge Options For ADP-89 . . . Limit one per turntable order. Specify Heath model number— | |
|--|--|
| 1c | Heath AD-117W Pickering V-15/ACE-3 Reg. \$28.95 |
| \$5 | Heath AD-36N Pickering V-15/ATE-3 Reg. \$39.95 |
| | Heath AD-109S Shure M93E Reg. \$28.95 |
| | Heath AD-58R Shure M93E Reg. \$39.95 |
| | Heath AD-127T Empire 888E Reg. \$28.95 |
| | Heath AD-88C Empire 888E Reg. \$39.95 |



ADP-69
\$59.50
(less cartridge & base)

New Garrard SL55B 4-Speed Automatic Turntable With Fully Adjustable Anti-Skate Control

• Famous Garrard Synchro-Lab motor for perfect RPM on all four speeds • Slide-in cartridge holder eliminates chance of misalignment • Adjustable anti-skate control • Adjustable stylus force adjustment • Viscous damped cueing • Isolated counterweight damps out resonances • Heath cartridge options

ADP-69, turntable only, (Garrard SL55B), 10 lbs. \$59.50
ADA-77-3, Power-Matic base, (Garrard B1P), 3 lbs. \$14.95
ADA-77-1, Coordinated base, simulated leather & ebony, (Garrard B1), 3 lbs. \$5.50
ADA-77-4, dust cover for ADA-77-1 base only, (Garrard D1), 4 lbs. \$5.50
ADA-59-2, 45 RPM spindle (Garrard FLRS35), 1 lb. \$1.95

ADP-69 SPECIFICATIONS: Same as ADP-89 except for speeds and dimensions. 78, 45, 33½ & 16½ RPM speeds. Dimensions: 14½" W. x 12½" D. x 4½" above, 2½" below motor board.

| NEW! Cartridge Options For ADP-69 . . . Limit one per turntable order. Specify Heath model number— | |
|--|--|
| 1c | Heath AD-159P Pickering P/ATE Reg. \$24.95 |
| \$5 | Heath AD-117W Pickering V-15/ACE-3 Reg. \$28.95 |
| | Heath AD-109S Shure M93E Reg. \$28.95 |
| | Heath AD-58R Shure M93E Reg. \$39.95 |
| | Heath AD-127T Empire 888E Reg. \$28.95 |
| | Heath AD-88C Empire 888E Reg. \$39.95 |



ADP-59
\$44.50
(less cartridge & base)

New Low Cost Garrard Model 40B

• Manual or automatic play of all four speeds • Viscous damped cueing • Adjustable stylus force control & gauge • Resiliently mounted counterweight damps out resonances • Low mass tubular aluminum tone arm • Special cartridge options

ADP-59, turntable only, (Garrard 40B) 10 lbs. \$44.50
ADA-77-3, Power-Matic base, (Garrard B1P), 3 lbs. \$14.95
ADA-77-1, Coordinated base, simulated leather & ebony, (Garrard B1), 3 lbs. \$5.50
ADA-77-4, dust cover for ADA-77-1 base only, (Garrard D1), 4 lbs. \$5.50
ADA-59-2, 45 RPM spindle (Garrard FLRS35), 1 lb. \$1.95

ADP-59 SPECIFICATIONS: Speeds: 78, 45, 33½ & 16½ RPM. Motor: 4-pole, induction surge type. Tracking: Tracks per cartridge specifications. Wiring: Stereo. Cables Furnished: Line cord & 2 audio. Color: Ebony & aluminum. Power Requirements: 110-130 VAC, 60 Hz. Dimensions: 14½" W. x 12½" D. x 4½" above, 2½" below motor board.

| NEW! Cartridge Options For ADP-59 . . . Limit one per turntable order. Specify Heath model number— | |
|--|--|
| 1c | Heath AD-159P Pickering P/ATE Reg. \$24.95 |
| \$5 | Heath AD-117W Pickering V-15/ACE-3 Reg. \$28.95 |
| | Heath AD-109S Shure M94E Reg. \$24.95 |
| | Heath AD-58R Shure M93E Reg. \$28.95 |
| | Heath AD-127T Empire 888E Reg. \$28.95 |
| | Heath AD-88C Empire 888E Reg. \$39.95 |

ADP-49
\$175.00
(less cartridge & base)



New Dual 1219 Professional Automatic Turntable With Variable Pitch Control

• Manual or automatic play of 78, 45 & 33½ RPM records with interchangeable center spindles • Manual spindle rotates with record to reduce wear • Four point gyroscopic gimbal tonearm suspension • Separate anti-skating adjustment for both spherical and elliptical cartridges • Perfect 15° stylus tracking in single play • Cue-control system silicone-damped in both directions to prevent bounce • Damped tonearm descent in both automatic and manual start • Precision elastically damped counterbalance adjustable in 0.01 gram click stops for exact tonearm balancing • Adjustable stylus overhang for minimum tracking error with any cartridge • Full 12" diameter dynamically balanced 7 lb. platter • Synchronous/continuous pole motor for exact speed • 6% speed adjustment on all three speeds for precise pitch

Proud Descendant of the Famous Dual 1019. Features like the massive 7 lb. dynamically balanced turntable, true 4-point gyroscopic gimbal tonearm suspension, variable pitch control, separate anti-skating adjustments for both spherical and elliptical cartridges and adjustable counterweight put the new Dual 1219 in the professional category. Even a better value when you take advantage of Heath's special cartridge offers.

ADP-49, turntable only (Dual 1219), 18 lbs. \$175.00
ADA-49-1, walnut base (Dual WB-19), 3 lbs. \$14.95
ADA-49-4, dust cover (Dual DC-9), 4 lbs. \$12.95
ADA-39-2, 45 RPM spindle (Dual AS-12), 1 lb. \$5.95

ADP-49 SPECIFICATIONS—Speeds: 78, 45 & 33½ RPM. Variable over 6% range. Motor: High torque synchronous/continuous pole. Tracking: Tracks per cartridge specifications. Record capacity: Up to 6. Record sizes: 7, 10 & 12". Color: Black/Silver. Cables furnished: Line cord & 2 audio. Power requirements: 100-130 VAC, 60 Hz. Dimensions: 18½" W. x 16" D. x 8" H.

NEW! Cartridge Options For ADP-49 & ADP-39 . . . Limit one per turntable order. Specify Heath model number—see below.

| | | | |
|------------|---|--|---|
| 1c | Heath AD-36N Pickering V-15/ATE-3 Reg. \$39.95 | Heath AD-58R Shure M93E Reg. \$39.95 | Heath AD-96H Empire 888E Reg. \$39.95 |
| \$5 | Heath AD-78A Pickering V-15/AME-3 Reg. \$49.95 | Heath AD-68F Shure M91E Reg. \$49.95 | Heath AD-88C Empire 888E Reg. \$49.95 |



New Dual 1209 3-Speed Auto/Professional Turntable

• Manual or automatic play of all three speeds with 6% pitch control • Separately calibrated anti-skating scales for spherical & elliptical stylus • Adjustable counterbalancing • Stylus pressure adjustment • Flawless ½ gram tracking

ADP-39, turntable only (Dual 1209), 14 lbs. \$129.50
ADA-39-1, walnut base (Dual WB-12), 3 lbs. \$10.95
ADA-24W, deluxe walnut base (Dual WB-93), 3 lbs. \$12.95
ADA-39-4, dust cover (Dual DC-2), 4 lbs. \$10.95
ADA-39-2, 45 RPM spindle (Dual AS-12), 1 lb. \$5.95

ADP-39 SPECIFICATIONS—Speeds: 78, 45 & 33½ RPM. Variable over 6% range. Motor: Synchronous/hi-torque. Tracking: Tracks per cartridge specifications. Color: Black/silver. Record capacity: Up to 6. Record sizes: 7, 10 & 12". Cables furnished: Line cord and 2 audio. Power requirements: 100-130 VAC, 60 Hz. Dimensions: 15½" W. x 13½" D. x 8" H.

Dual 1212 Auto/Standard Turntable

• Plays 3 speeds manual or automatic • Direct-dial tracking force & synchronized anti-skating • Silicone-damped cue-control • Adjustable pitch control • Tracks at 1 gram

ADP-38, turntable only (Dual 1212), 13 lbs. \$89.50
ADA-39-1, walnut base (Dual WB-12), 3 lbs. \$10.95
ADA-24W, deluxe walnut base (Dual WB-93), 3 lbs. \$12.95
ADA-39-4, dust cover (Dual DC-2), 4 lbs. \$10.95
ADA-39-2, 45 RPM spindle, 1 lb. \$5.95

ADP-38 SPECIFICATIONS—Speeds: 78, 45 & 33½ RPM. Variable over 6% range. Motor: Hi-Torque. Tracking: Tracks per cartridge specifications. Color: Black/silver. Record capacity: Up to 6. Record sizes: 7, 10 & 12". Cables furnished: Line cord & 2 audio. Power requirements: 100-130 VAC, 60 Hz. Dimensions: 15½" W. x 13½" D. x 8" H.

| NEW! Cartridge Options For ADP-38 . . . Limit one per turntable order. Specify Heath model number—see below. | |
|--|--|
| 1c | Heath AD-117W Pickering V-15/ACE-3 Reg. \$28.95 |
| \$5 | Heath AD-36N Pickering V-15/ATE-3 Reg. \$39.95 |



ADP-38
\$89.50
(less cartridge & base)

Year-Round Enjoyment For The Entire Family...
The Heathkit/Thomas Solid-State Theatre Organ

This Thomas 40 Lesson Self-Teacher Record Course Is FREE When You Buy Either Organ

Sells For \$19.95, a fifty dollar value, and now it's yours FREE when you buy either TO-67 or GD-325D organs. Provides firm basis of musical knowledge. Includes four 33 1/3 RPM 12" records, comprehensive music book with many song favorites, gold-embossed white leatherette album, GDA-232-2, recorded lessons, 5 lbs., available separately.....\$19.95

• All genuine Thomas factory-fabricated components • 19 organ voices . . . 15 keyboard, 4 pedal • Exclusive Thomas instant-play Color-Glo • 200 watts peak power produced by two separate transistor amplifiers • "Stereo" sound • Two separate speaker systems . . . 2-speed Leslie, plus main system with two 12" speakers • Two 44-note keyboards • 28 notes of electronic chimes • 13-note bass pedals • Selective repeat percussion • Selective attack percussion • Manual balance control • Keyboard and pedal sustain • Timbre mellow • 3 tremulant tabs . . . vibrato, tremolo & slow • Pedal percussion and volume • Expression pedal • Stereo headset outlet • Reverb • Walnut finish hardwood cabinet and bench

19 True Organ Voices . . . With Hundreds Of Voice Combinations Possible! 15 keyboard voices, 4 pedal voices . . . all at the flip of a tab. For solo work . . . diapason 16', bass clarinet 16', trumpet 16', English horn 8', oboe 8', violin 8' and tibia 16', 8', 5 1/3' and 4'. For accompaniment . . . diapason 8', saxaphone 8', French horn 8', oboe horn 8' and cello 8'. And now, four pedal voices . . . diapason 16', major flute 8', bass clarinet 8', and string bass 8'. And you'll soon learn voice combinations to produce the sounds for the Spanish guitar, zither, bagpipes, calliope, banjo, etc. Plus other variations for every musical mood . . . show tunes, classical, religious, even rock & roll.

Kit TO-67, organ & matching bench, 265 lbs...
(Express or motor frt.).....\$1095.00
TOA-67-3 (7", 33 1/3 rpm demonstration record).....ppd. 50c

Add The Full Orchestra Sound of Band Box Percussion

Automatically adds Bass Drums, two different Bongos, Castanets, Brush and Crash Cymbals, Blocks, Claves, Snare Drum and Drum Roll . . . ten different percussion instruments to the music you play. One or all may be pre-selected to sound as you play the lower manual, pedals or both. Adjustable volume control. Assembles easily in just 4 to 6 hours.

Kit TOA-67-1, 9 lbs.....\$160.00

Attention Heathkit/Thomas Organ Owners! The Thomas Band Box may be added to all previous and present Heathkit/Thomas organ kits. Special drawer and slides are required for support (except with new TO-67). Assembly manual covers installation into all model GD-232, GD-325 and GD-983 organs. TOA-67-2, 4 lbs....Band Box drawer and slides.....\$40.00

America's Lowest Cost All-Transistor Organ . . . Heathkit /Thomas
"Artiste" With Color-Glo And Scandia Finish

• Exclusive Thomas Color-Glo to start you playing instantly • All genuine Thomas factory-fabricated components • 10 true organ voices • Variable repeat percussion . . . produces banjo, mandolin, balalaika effects • 13-note heel and toe bass pedals range C₁ through C₂ • 2 overhanging 37-note keyboards, range C₂ through C₅ each • 75 watt peak music power amplifier • 12" speaker • Vibrato • Manual balance control • Transistorized plug-in tone generators, the heart of the organ, warranted for 5 years • Fully transistorized for better tone, longer life, trouble-free operation • Beautiful oiled-walnut finish cabinet and bench

Compare The Features, Compare The Price. Features like two keyboards with 74 notes; 10 organ voices . . . trombone, reed, flute, oboe, cornet, violin, saxophone, horn, viola and diapason . . . all at the touch of a tab; variable repeat percussion for additional voice effects; 13-note bass pedals; instant-play Color-Glo; 12" speaker; variable vibrato; and cool all-transistor circuitry. It's all there at one low price including the bench . . . no extras to buy as with other organ kits. The GD-325D makes a handsome piece of furniture you'll be proud to have in your home. Cabinet and bench have beautiful Scandia oiled-walnut finish.

Kit GD-325D, organ and matching bench, 172 lbs...
(REA or motor freight only).....\$449.95

Export model available for 115-230v. AC, 50-60 Hz; write for prices.

GDA-325-1 (7", 33 1/3 rpm demonstration record).....ppd. 50c

Add The Full Orchestra Sound Of Percussion With The Band Box Kit

Kit TOA-67-1, 9 lbs.....\$160.00
Kit TOA-67-2, 4 lbs., Band Box Drawer and Slides.....\$40.00

Add 15 Different Rhythms With The Playmate Kit

Kit TOA-67-5, 6 lbs.....\$195.00



TO-67
\$1095.00

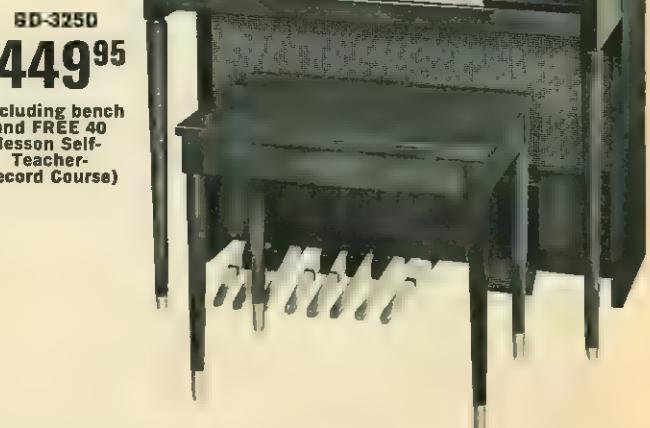
(Without Band
Box or Playmate)



Playmate Kit
Creates Rhythms
For Organ
And Band Box

Adds any of these 15 different rhythms to the music you play . . . Waltz, Viennese Waltz, Jazz Waltz, Fox Trot 2/4, Boogie 6/8, Swing, Rock, Watusi, Samba, Beguine, Cha Cha, Rhumba, Tango, Bolero, Bossa Nova. With just a push of a button you apply rhythm to the organ lower manual and foot pedals only, to the Band Box only . . . or for maximum musical effect to the lower manual, foot pedals and Band Box together. Also features adjustable Tempo Control, flashing Downbeat Light, Downbeat Accent Button, and Touch Control which silences Band Box when organ's lower manual and foot pedals are not being played. Easy assembly and installation. For that full orchestra sound, add the Playmate to your Heathkit/Thomas organ now. The Band Box must be installed on the organ first. Kit TOA-67-5, 6 lbs.....\$195.00

Attention Heathkit/Thomas Organ Owners. The Playmate rhythm maker may be added to all previous and present Heathkit/Thomas electronic organs which have Band Box installed. No additional accessories are necessary to do this.



GD-325D
\$449.95

(including bench
and FREE 40
lesson Self-
Teacher-
Record Course)

Heathkit® Guitar & Combo Accessories

Heathkit TD-17 Electronic Metronome . . . Solid-State Construction . . . High Accuracy

• Adjustable from 40 to 210 beats per minute • Very accurate • All solid-state construction for long, trouble-free life • Adjustable volume • Battery operated • Handsome cherry finish • Easy circuit board assembly

Now, In Answer To Many Requests, There's A Heathkit Electronic Metronome . . . the new TD-17. We were asked for a metronome that would be inexpensive enough for a student to use, yet accurate enough to please a professional musician. The new Heathkit TD-17 meets these requirements perfectly.

An Important Tempo-Teaching Aid. Beginning music students often have difficulty remembering what tempos are signified by such words as "Allegro," "Andante," etc. The use of the new TD-17 will help them by providing an audible, repeatable reference for all tempos, and make practice more enjoyable by giving them a "feel" for the speed of the music they are playing. The Ideal Choice For Student Use. The Heathkit Electronic Metronome is very easy to use . . . just set the tempo you desire on the large, easy-to-read dial and adjust the volume with the handy control on the back panel. For reference purposes, there's a chart on the bottom panel that converts tempos in different time signatures to beats per minute. The TD-17 is adjustable from 40 to 210 beats per minute and because it uses no wind-up spring mechanisms, its accuracy is both excellent and unchanging. Two 9 volt batteries in the all solid-state circuit last 300 hours and make battery changing a rare occurrence.

Simple, Fast Assembly. The new TD-17 goes together on one small circuit board. Construction time is about two hours. Finished in handsome cherry, the TD-17 will look right in any music room. Order yours now.

Kit TD-17, 2 lbs.....\$12.95

Model GDA-48-1, 1 lb., battery for TD-17 (requires 2).....ea. \$1.30

TD-17 SPECIFICATIONS—Range: Continuously variable from 40 to 210 beats per minute; calibrated in 5 beats per minute intervals. Battery requirements: 18 volts; two long life 9 volt batteries (NEDA #1602)—(batteries not supplied). Battery life: Approximately 300 hours. Cabinet: Cherry-finished birch solids and veneers. Overall Dimensions: 6 1/4" H x 3 3/4" W x 4" D. Net weight (less batteries): 11 oz.



Heathkit 60-Watt Dual-Channel Guitar Amplifier

• 25 watts EIA music power, 60 watts peak power—maximum power from Fail-Safe Complementary Transistor Output Circuit • Two channels—one normal for accompaniment, microphone, etc.—the other for special effects, lead and solo guitars, has reverb and tremolo • 2 inputs each channel • Variable Reverb uses Hammond double spring delay unit • Specially designed LDR Tremolo circuit is variable in both speed and depth • Line bypass reversing switch for hum reduction • 2 special design 12" heavy-duty ceramic magnet speakers • Two foot switches in heavy die cast housing for hands-free control of tremolo and reverb • One simple to build circuit board with 13 transistors and 6 diodes • Heavy-duty power transformer—120 v. or 240 v. AC 50/60 Hz • Leather-textured black vinyl covered cabinet of 3/4" stock . . . measures 28" W x 9" D x 19 3/4" H • Black and white patterned grille cloth • Extruded aluminum front panel with black nomenclature and chrome-plated knobs with black inserts

All The Features Guitarists Want Most In An Amplifier, at less than half the usual cost. Delivers the coolest 25 watts of EIA music power or 60 watts of peak power you've ever heard . . . with a pure, robust sound that brings out the natural tone of your instrument. And since it's all solid-state, there are no tubes to deteriorate or wear out—you get peak performance at all times. Two channel versatility too . . . the normal channel for accompaniment, accordion or singer's mike . . . the other channel for lead & solo guitars has variable reverb & tremolo. Build the kit in 8-10 hours and save \$80. Order yours now.

Kit TA-16, 52 lbs.....\$119.95



Single Channel Guitar Amplifier . . . High Performance . . . Low Cost

• 20 watts of EIA power, 40 watts peak • Variable tremolo • Variable reverb with Hammond double spring delay unit • Single channel with two inputs handles lead & solo guitars, singer's microphone • Special design heavy-duty 12" speaker • Two foot switches in heavy die-cast metal housing for hands-free control of tremolo and reverb • Line bypass reversing switch reduces hum • Simple circuit board construction • 11 transistor, 6 diode circuit with "Fail-Safe" complementary transistor output • Heavy-duty transformer operated power supply with circuit breaker protection for 120/240 v. AC 50-60 Hz • Leather-textured black vinyl covered wood cabinet • Extruded aluminum front panel with chrome-plated knobs

Kit TA-27, 40 lbs.....\$79.95



Heathkit Distortion Booster

Add The "Mod" Sound To Your Guitar . . . with the Heathkit Distortion Booster. Just plug it in between your guitar & amplifier and you've got that unique sound. Housed in a convenient footswitch . . . just push the switch to add the distortion, push again to play it straight. Controls allow variation of tone & degree of distortion. Runs on 1.5 V AA penlight cell (not supplied). Kit TA-28, 4 lbs.....\$17.95

Shure Model 515SAC Unidirectional

Particularly suited for small combos and singers and ideal for use in clubs, theatres, auditoriums. Features high impedance input, wide 80 to 13,000 Hz response, on-off switch with lock. Comes with 15' non-detachable cable, swivel adapter and phono plug adapter. Satin chrome finish. GDP-278, 5 lbs.....\$25.87



Heathkit Guitar Headphone Amplifier

Practice Your Guitar Playing In Private . . . only you can hear when you use this handy little unit. Plugs directly into your guitar and runs on one 9 V battery. Two headphone outputs so both you and your teacher can hear your playing. Will operate any headphones to 2 Megohms. Build it in an evening. Kit TA-58, 2 lbs.....\$9.95

Atlas Model MS-10C Floor Stand

Full features at a low price. 2-section chrome tube adjusts from 35" to 63" . . . interlined with bakelite to prevent jamming or sudden dropping. Long clutch can be gripped by entire hand, not just fingers. 10" gray base. Self-leveling shock-absorbing pads. 5/8"-27 thread. GDP-106, 11 lbs.....\$8.16

Heathkit® Guitar Amplifiers

TA-17
\$175.00

TA-17-1
\$120.00



TA-38
\$225.00



The two 12" heavy duty aluminum dome speakers are designed to handle the full bass frequency range at high power levels without overloading.

120 Watt Solid-State Combo Amplifier . . . Professional Features At A Modest Price

• Delivers 120 watts of EIA music power (240 watts peak power) into two TA-17-1 speakers (or other 4 ohm load), 90 watts into one TA-17-1 speaker (or other 8 ohm load). • Will drive any 4 to 16 ohm speaker combination. • Cool all-silicon transistor circuitry. • Built-in switchable Harmonic Modifier. • Brightness switch for that brassy sound. • Separate bass and treble boost. • Tremolo variable in rate and depth. • Dual spring-type variable reverb. • Dual footswitch for on-off control of tremolo and reverb. • Independent 2 input guitar channel. • Independent 2 input channel with special tone control for bass guitars, combo organs. • Independent 2 input channel with bass & treble tone controls for microphones or phonographs. • Special "test-as-you-build" feature to prevent damage to components. • "Piggyback" design with carrying handles for stacking and portability. • Black vinyl-covered compressed-wood cabinet. • Circuit breaker protection. • New optional heavy-duty vinyl amplifier cover for protection in transit.

More Than Enough Scene-Shaking Sound To Take Out Any Gig, Large Or Small, Indoors Or Out. Delivers a whopping 120 watts through two Heathkit TA-17-1 speaker systems, or 90 watts through one TA-17-1. Runs at maximum power without danger of overload thanks to special volume control circuits in both guitar & bass channels. Versatile too...you can play guitar through it, or bass guitar, combo organ, accordion, singer's mike, even a record changer.

Kit TA-17, Amplifier Only, 44 lbs. \$175.00
Model TAA-17, 2 lbs. Optional protective cover for TA-17. \$9.95

Heathkit TA-17-1 Speaker Systems . . .

Make A Perfect Combo With The TA-17 Amplifier

• Two specially-designed 12" woofers with 27 ounce magnets and fiberglass voice coils. • Special horn driver for greater brilliance. • 8 ohm system impedance. • Rugged black vinyl-covered compressed wood cabinet with metal corners, extruded aluminum front frame & dark blue grille cloth. • Carrying handles and casters for easier portability and fast set-up. • Optional heavy-duty vinyl cover provides added protection during transit. • Fast, easy assembly.

Boasts A Unique Horn Driver Unit to handle the highs with a superb brilliance that can't be matched by systems using woofers only. And the specially-designed 12" woofers, produce a solid low end. Each woofer features a 27 oz. magnet with a fiberglass voice coil, treated cloth suspension system and epoxy cements...will safely handle 90 watts of EIA rated music power. System impedance is 8 ohms. The specially engineered sealed cabinet is solidly constructed of a black vinyl-covered 3/4" compressed wood with metal corner protectors. Front is styled with an extruded aluminum frame and midnight blue grille cloth. Has handles and casters so it makes it easily to any scene. Measures 25 1/8" W x 14 1/2" D x 38" H, not including casters & handles. Includes 20' cable.

Easy To Build. Just wire one simple circuit board power supply, controls and mount the speakers...goes together in just 12-15 hours. Plug in, turn on and have everyone stand back! You've just built the wildest bass amp available anywhere. Order yours now and make the other groups wonder why you have all the sound, and they spent all the money.

Kit TA-17-1, one speaker system, 116 lbs. \$120.00
Model TAA-17-1, Optional protective cover for TA-17-1, 5 lbs. \$13.95

Best Value Automotive Equipment

ID-29
\$29.95



NEW! Heathkit ID-29 Tune-Up Meter . . . Measures Dwell, RPM & DC Volts On 3, 4, 6 & 8 Cylinder 4-Cycle Engines

• Three automotive test instruments in one. • Measures Dwell on all 4-cycle, 3, 4, 6 or 8 cylinder engines. • Two RPM scales—0-1500 and 0-4500 revolutions. • Measures DC voltage from 0 to 15 volts. Dwell and VDC scales are direct reading. • Uses only two leads. • Running engine provides both signal and power...uses no batteries. • Both Dwell & RPM measurements can be taken without reconnecting leads. • Can be used on both 6 and 12 volt systems without switching or changing leads. • No recalibration is necessary from day to day or engine to engine. • Very stable all solid-state circuitry. • 3% accuracy. • Completely portable...handy for road testing...comes in its own carrying case that's unaffected by water, oil, gasoline and most acids. • Easy to build. • Can be used with either positive or negative ground systems.

Kit ID-29, 4 lbs. \$29.95

ID-29 SPECIFICATIONS—Dwellmeter: Four direct reading scales; 8 cyl.—0-45 degrees; 6 cyl.—0-60 degrees; 4 cyl.—0-90 degrees; 3 cyl.—0-120 degrees. Tachometer: Two RPM ranges; Low range—0-1500 RPM; High range—0-4500 RPM. Voltmeter: Direct reading scale, 0-15 VDC. Power requirements: 10 mA approximately average current. Meter: 4 1/2" x 1 mA (100 degree movement). Accuracy: ±3% of full scale. Dimensions: 8 1/2" W x 4 1/4" H x 7 1/4" D (including handle). Net weight: 2 1/2 lbs. Recommended for use with standard ignition systems only.

MI-18-1
Panel Mount
\$29.95



Dash-mounted, the MI-18 looks sharp...requires only a 3 1/4" hole, 2 1/4" deep.



MI-18-2
Case Mount
\$32.95

Heathkit Solid-State Tachometer . . . Case Or Panel Mount

• Unique inductive pickup allows use with virtually any spark-type engine—any ignition system. • Two RPM ranges—0-6000 & 0-9000. • Temperature-compensated for ±5% accuracy from 0°-120° F. • Wide-angle 250° edge-lighted dial. • Stainless steel hardware. • Adjustable red line. • Non-scratch glass face. • Splash-proof case. • Can be panel mounted or installed in its own handsome black & chrome case. • Fast assembly—all components mount on unique circular circuit board that fits inside case—only one unit to install.

Kit MI-18-1, (For panel mounting), 3 lbs. \$29.95
Kit MI-18-2, (includes mounting case & hardware), 3 lbs. \$32.95

MI-18 SPECIFICATIONS—Trigger Sensitivity (Minimum Requirements): Pickup Coil: 25 mA peak, 5 uS rise time. Tach Connection: 30 volt negative pulse, 20 uS rise time. Meter Range: 0-6000 r/min. or 0-9000 r/min. Engine Capability: 1 to 6 cylinders, 2 cycles; 2 to 8 cylinders, 4 cycles. Accuracy: ±3% at calibrating temperature (when calibrated at full scale), ±5% from 0 degrees F. to +120 degrees F. Power Requirements: 10.5 to 17.5 volts DC, 25 mA at 12 volts DC, 125 mA with lamp. Dimensions: Model MI-18-1, 3 3/4" overall face diameter. Mounts in 3 1/4" hole. 2 1/4" overall case depth. Model MI-18-2, 3 3/4" overall face diameter. 4 1/4" high. 3" overall case depth. Weight: MI-18-1, 14 oz. MI-18-2, 17 oz.



10-20
\$109.95

See Your Car's Ignition Pattern With This Heathkit Ignition Analyzer

• Spots ignition troubles—shows results of corrective action. • Just flip a switch to select any of 4 different patterns without switching leads. • Expand any view horizontally or vertically for a "closer look". • Easy to use—detailed instruction manuals provided for simple assembly and operation. • Use on any internal combustion engine with conventional, non-transistor ignition system*.

Kit IO-20, 18 lbs. \$109.95
Export model available for 115/230 VAC, 50-60 Hz; write for prices.

IO-20 SPECIFICATIONS—Rpm Range: 400-5000 rpm. Displays: Secondary, Primary, Parade, Super-imposed. Screen size: 4 1/4" diameter. Dwell measurement: 4, 6 & 8 cylinder calibration on face plate. Pattern height: Secondary circuit, approx. 1"; Primary circuit, 6 volt system 3/4", 12 volt system 1". Vertical expand ratio: 2 to 1. Horizontal expand ratio: 10 to 1. Cable length: 12' pick-up clamp, ground and secondary clip leads extend 2' beyond pick-up clamp. Power requirements: 105-125 V, 50/60 Hz AC, 30 watts.

*It is impractical to portray the patterns produced by the many different ignition systems (transistor, SCR, Capacitor Discharge, Induction pick-up, etc.) currently used experimentally. In most cases the IO-20 will function satisfactorily and with a little experience the display will prove equally meaningful to the user as conventional systems. Heath Company can NOT supply advice on interpretation of such displays.

Gilbert-Davis Basic Tester Set For Car Tune-Up And Repair

Ideal For Do-It-Yourselfers & Professionals. Includes Model 34 Remote Starter Switch with push button & long leads...Model 35 Compression Tester that reads 0-300 lbs.; 15" offset to reach back cylinders...Model 36 Vacuum/Fuel Pump Tester with 2 1/2" 3-color dial, calibrated 0-30 inches for vacuum and 0-7 lbs. for pressure...Model 37 Engine Timing Light with molded plastic case, long leads & rubber covered connectors.

GFP-83, 4 lbs. \$12.95



10-11
\$19.95

Timing Light Kit . . . Adds More Versatility To The IO-20 Ignition Analyzer

Especially Designed For Use With The IO-20. Produces an intense white light that shows timing marks even in bright sunlight. Features a speed range of 0-2500 flashes per minute (0-2500 rpm for current conventional 4-cycle engines). The long-life, hard-rubber pistol grip case comes complete with 10' of cable. Measures 6" H x 7 1/2" L x 2" W.

Kit ID-11, 3 lbs. \$19.95

Save with Heathkit® Garage Door Openers

New Miniature Portable Transmitter
The size of a pack of cigarettes... fits pocket, purse, clips on sun visor. Operates up to 150' from garage door. Factory assembled, ready to use.

New Sensitive Solid-State UHF Receiver
Factory assembled and adjusted... takes just minutes to install. Has selectable tone coding to prevent interfering with similar neighborhood units. Operates on 290 to 320 MHz.

Kit Form Mechanism Assembled Transmitter & Receiver
GD-209A

\$149.95

Deluxe Radio-Controlled Screw-Drive Garage Door Opener Semi-Kit . . . Fast, Simple One Evening Assembly

• Factory assembled UHF transmitter & receiver • Miniature portable "wireless" transmitter • Operates up to 150 feet • Powerful screw-drive mechanism—silent, reliable, extra safe • Easy to build—all leads cut to length with connectors installed—just push on terminals, no soldering • Simple installation • Operates 7½' overhead track and jamb & pivot doors (with adaptor) • Positive "locking" action withstands over 6000 lbs. pressure • Four safeties forward, two reverse—cannot injure children, pets, cannot damage car tops, etc • Quick-release door arm permits manual operation in case of power failure • Built-in automatic light • No FCC license required • No interference • Selectable tone coding prevents interference by similar neighborhood units

The Next Best Thing To A Personal Doorman. This new deluxe Heathkit radio-controlled garage door opener combines the convenience you want with the reliability and safety you need. Just a touch of the button on the "wireless" transmitter and your garage door opens and the light turns on... drive inside and another touch of the button closes the door quietly, securely... and the light stays on long enough for you to enter your home.

Rugged, Safe Construction & Long-Term Reliability. The giant 8½' long screw mechanism coupled with the husky ¼ HP motor give many years of dependable operation. The built-in safety switch and slip clutch act together to instantly reverse the door should it meet the smallest obstruction... "safety-engineered" for children, pets, toys, etc. And there's no need to worry about snow or ice build-up causing the door to reverse... the built-in Snow Safety takes over a short distance from the floor to compensate for this.

Virtually Maintenance-Free. Because of the unique screw-drive design, there are no chains to stretch, break or be oiled... no sprockets to wear. The screw itself is kept clean automatically as it turns, and the motor never needs oil. Internal electrical safeties & limit switches assure instant response to every situation.

New Miniature Portable Transmitter
No larger than a pack of cigarettes... fits easily in glove compartment, pocket, purse or attach to sun visor. Operates up to 150 feet from receiver. Factory Assembled.

Kit Form Mechanism Assembled Transmitter & Receiver
GD-179A

\$119.95

Radio-Controlled Chain-Drive Garage Door Opener Semi-Kit . . . Solid-State Transmitter & Receiver

GDP-159, 2 lbs., 2 transmitters, 1 receiver..... \$64.95
GDP-99, 1 lb., transmitter only..... \$15.95

KIT MECHANISM SPECIFICATIONS: 125" L x 8½" H x 13" W, 100 # max. operating force. Operates overhead track and most jamb & pivot doors up to 8' high. 117 v. AC ½ H.P. motor. Fused.
UHF TRANSMITTER SPECIFICATIONS: Powered by standard 9-volt transistor type battery (Eveready No. 216 or equivalent). RF Frequencies: Approx. 290-320 MHz modulated with 12 to 23 kHz. Operating Range: Up to 150' from receiver (adjustable). Useful Temperature Range: -50° to +140° F. Size: 3½" x 2½" x 1½". Weight: 5 ounces.
UHF RECEIVER SPECIFICATIONS: RF Frequencies: Approx. 290-320 MHz modulated with 12 to 23 kHz. Useful Temperature Range: -50° to +140° F. Size: Approx. 4½" x 3½" x 1½". Power Requirements: 117 VAC, 60 Hz.

GD-51A
\$24.95

• No connecting wires between units... just plug into nearest AC or DC outlet • All transistor circuit—built-in power supply • Choice of 2 operating frequencies • Add as many units as you wish anytime • 2-tone beige plastic cabinets • Variable squelch to quiet background noise

Handy Household Kits

Save Time, Steps & Your Voice With A "Wireless" Intercom

Just Plug It In, Push The Press-To-Talk Bar to talk, release to listen. PTT bar has a spring-return to "listen" and a "dictate" hold position for keeping tabs on baby, or for predominately one-way transmissions. Saves you valuable steps and time... eliminates annoying shouting. Use any number anywhere, as long as they operate on same power line.

Kit GD-51-2 (pair), 10 lbs..... \$48.50
Kit GD-51A (one station), 5 lbs..... \$24.95
GD-51A SPECIFICATIONS—Power requirements: 105-125V, 50/60 Hz AC or DC. Standby power: 2.5 watts. Transmit frequency: 220 kHz & 180 kHz (switch selected). Size: 6½" H x 8" W x 7½" D.

Heathkit Solid-State Indoor-Outdoor Intercom System

• Master unit handles up to 5 remote stations • Ideal for home & small offices • Weatherproof outdoor remote • Powerful, one-watt output for crisp, clear communications • Compact, designer-styled cabinets

Identify Callers Before You Open The Door... with the outdoor remote unit installed at your front entrance. It adds to your personal safety... especially late at night, or when your family is alone. You can place up to 5 remote stations anywhere around the house... outdoor units at both the front and back entrance... indoor units in the den, garage, or basement workshop. Here's real convenience to save you time and steps.

Private Calls Or Paging. The master unit features selective and all-call switches... talk to the office "steno", your son in the garage, or call the whole family to dinner. The all-transistor circuitry requires no warm-up time... your Heathkit Intercom will be ready and waiting for instant use.

Convenient Outdoor Remote features a weather-resistant aluminum grille, weatherproof seal, specially-coated speaker, doorbell button, and 50' of 2-wire cable.

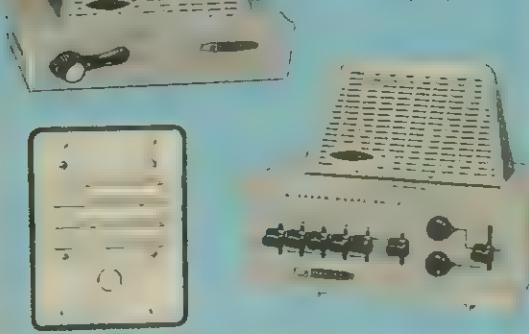
Kit GD-121 Master Station, 6 lbs..... \$29.95

Kit GD-131 Indoor Remote, 4 lbs..... \$5.95

Kit GD-141 Outdoor Remote, 2 lbs..... \$5.95

SPECIFICATIONS—Power requirements: 117 v ac 50/60 Hz 2.5 watts (idle), 3.5 watts (full output). Transistors: four 2N1274. Dimensions: 6½" H x 8" W x 7½" D (master), 5" H x 8" W x 6" D (outdoor remote).

All 3 Units
\$44.85



Unique Heathkit Home Protection System

Alerts Your Family To These Emergencies . . .

- Intrusion
- Smoke & Fire
- Freezing
- Thawing
- Rising Water
- High Temperature
- Power Failure
- Changing Temperature

Low Cost Protection. The Heathkit Home Protection System gives you that priceless peace of mind that comes from knowing that you have provided for the safety of your family and property in times of emergency. The easy-to-build solid-state units use very little power and incorporate "fail-safe" circuitry. Simple installation... just plug the units into the nearest AC outlet. The AC power line connects the units, and the system can be used over long distances if all units are on the same side of the AC line transformer. Since alarm signals will appear on all AC lines on the same side of the outdoor pole transformer, a community alarm system can be set up... your neighbor can keep watch over your property when you're gone. The unique signaling method, developed by Berkeley Scientific Laboratories, exclusively licensed to Heath, is virtually immune to random noise and signals generated by other devices. The system has almost limitless applications in homes, farms, industries... use as many units as you need and "customize" your installation.

GD-77 Receiver Alarm... designed for use with the Smoke Detector/Transmitter and Utility Transmitter. In case of emergency it sounds a high-pitched, very audible tone that will be heard anywhere in a normal size house... even while you're sleeping. Extra receivers may be added anywhere you want, or bells or buzzers may be plugged in to extend the audible range. The "fail-safe" circuit has a continuously charged nickel-cadmium battery that's automatically switched into the circuit & sounds the alarm if power fails; it also warns you if any of the other units malfunction or the receiver is accidentally disconnected.

GD-87 Smoke-Heat Detector/Transmitter... consists of a smoke detector, heat sensor and transmitter. When the smoke detector or heat sensor is activated, it generates a signal, triggering the Receiver Alarm. The sensitivity control can be adjusted to activate the circuit at very low smoke densities; the heat detector triggers automatically at 133° F. Its "fail-safe" circuit signals the receiver if a component should fail. The unit can be used by itself or external remote heat sensors can be added in any location.

GD-97 Utility Transmitter... accepts any type switch or sensor to detect any hazard you wish to guard against. Its transmitter actuates the Receiver Alarm. Your imagination is practically the only application limit. Any sensor that produces an open or closed circuit situation when actuated can be used. A heat sensor, magnetic reed and micro switch are available from the Heath Company which will suit many applications. The sensors may be used to act as alarms against heat & fire, intrusion, flood, or thawing or cooling in farming and food storage applications. Its "fail-safe" operation automatically generates a warning signal in the event of component failure. The indicator lamp lights when the unit is transmitting... an aid to localizing the problem area when more than one transmitter is used.

Kit GD-77, receiver-alarm, 4 lbs..... \$39.95

Kit GD-87, smoke-heat det./trans., 4 lbs..... \$49.95

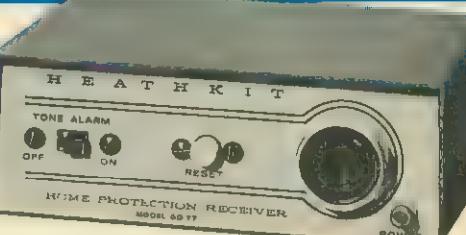
Kit GD-97, utility det./trans., 2 lbs..... \$34.95

GDA-97-1, miniature magnetic-reed switch for windows and doors, 1 lb..... \$1.80

GDA-97-2, miniature micro switch for windows and doors, 1 lb..... \$2.00

GDA-97-3, 133° F. heat sensing switch, 1 lb..... \$2.25

Kit GD-77
\$39.95



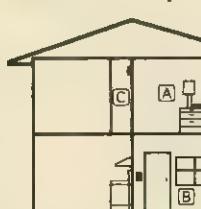
The Receiver Alarm of the Home Protection System is always ready to warn you of any emergency.

Kit GD-87
\$49.95



Kit GD-97
\$34.95

The Utility Transmitter signals Receiver Alarm of fire & excess smoke.



Explanation of Diagram

- (A) Receiver Alarm in Master Bedroom
- (B) Utility Transmitters in Pool Area, Garage & Living Room
- (C) Smoke-Heat Detector/Transmitters in hallway near bedrooms and in Utility Rooms

HEATH EASY PAYMENT PLAN

1. BY MAIL

Complete the simple reverse side of Payment Plan. Always Use The Same check or money order to another order to another order blank.

ABOUT EASY PAYMENT PLAN

The "Cash Price" of merchandise on Heath's Easy Payment Plan includes the Cash Price as listed on the page describing the merchandise plus applicable sales tax, shipping charges and less any advertised allowances. The "Deferred Payment Price" is the Cash Price plus the **FINANCE CHARGE**. The "Total Payments" is the "Deferred Payment Price" less any "Down Payment". The number of payments is 12 or 18 as listed in the Easy Payment Chart. The **ANNUAL PERCENTAGE RATE** of the **FINANCE CHARGE** is 18%.

Minimum amount that can be financed is \$35.00. No down payment is required on orders up to \$300; however, a down payment will reduce your monthly payments and **FINANCE CHARGE**. On orders over \$300, a down payment of 10% is required. Write for details on orders over \$500.

HOW TO OPEN AN ACCOUNT

Just fill out the statement, sign the agreement, and mail to Heath with your order.

ADD-ON PURCHASES

Once your credit is established you can add-on purchases of \$35.00 or more with no down payment. List items you want on order blank, check the add-on box and give your account number. Sign the time payment agreement and send us with original payment book.

NOTICE TO BUYER:

1. Do not sign the contract before you read it.
2. Under certain conditions you may redeem the property if repossessed for a default.
3. The other side of this page is part of this contract.
4. If you pay in full in advance, any unearned **FINANCE CHARGE** will be rebated under The Rule of 78. IF FULL AMOUNT IS PAID WHEN FIRST INSTALLMENT DUE (30 days after shipment), THEN YOU SAVE ENTIRE **FINANCE CHARGE**.

| | | 12 Monthly Payment Plan | | 18 Monthly Payment Plan | | *Final Payment is an odd amount. Can be larger or smaller than regular payment. |
|---|----------------|-------------------------|---|-------------------------|-----------------|---|
| If Cash Price Less Down Payment Amounts To: | Finance Charge | Monthly Payment | If Cash Price Less Down Payment Amounts To: | Finance Charge | Monthly Payment | |
| \$ 35.00 - \$ 37.50 | \$ 3.65 | \$ 3.30 | 220.01 - 230.00 | \$ 22.50 | \$ 21.00 | |
| 37.51 - 40.00 | 3.90 | 3.55 | 230.01 - 240.00 | 23.50 | 22.00 | |
| 40.01 - 42.50 | 4.15 | 3.80 | 240.01 - 250.00 | 24.50 | 22.50 | |
| 42.51 - 45.00 | 4.40 | 4.00 | 250.01 - 260.00 | 25.70 | 23.50 | |
| 45.01 - 47.50 | 4.65 | 4.25 | 260.01 - 270.00 | 26.70 | 24.50 | |
| 47.51 - 50.00 | 4.90 | 4.50 | 270.01 - 280.00 | 27.70 | 25.00 | |
| 50.01 - 55.00 | 5.25 | 4.75 | 280.01 - 290.00 | 28.70 | 26.00 | |
| 55.01 - 60.00 | 5.75 | 5.25 | 290.01 - 300.00 | 29.70 | 27.00 | |
| 60.01 - 65.00 | 6.25 | 5.75 | 300.01 - 310.00 | 30.70 | 28.00 | \$45.50 \$19.50 |
| 65.01 - 70.00 | 6.80 | 6.25 | 310.01 - 320.00 | 31.70 | 29.00 | 47.00 20.00 |
| 70.01 - 75.00 | 7.30 | 6.75 | 320.01 - 330.00 | 32.70 | 30.00 | 48.50 20.50 |
| 75.01 - 80.00 | 7.80 | 7.00 | 330.01 - 340.00 | 33.70 | 31.00 | 50.00 21.50 |
| 80.01 - 85.00 | 8.30 | 7.50 | 340.01 - 350.00 | 34.70 | 32.00 | 51.50 22.00 |
| 85.01 - 90.00 | 8.80 | 8.00 | 350.01 - 360.00 | 35.70 | 33.00 | 53.00 22.50 |
| 90.01 - 95.00 | 9.30 | 8.50 | 360.01 - 370.00 | 36.70 | 34.00 | 54.50 23.50 |
| 95.01 - 100.00 | 9.80 | 9.00 | 370.01 - 380.00 | 37.70 | 35.00 | 56.00 24.00 |
| 100.01 - 110.00 | 10.45 | 9.50 | 380.01 - 390.00 | 38.80 | 36.00 | 57.50 24.50 |
| 110.01 - 120.00 | 11.50 | 10.50 | 390.01 - 400.00 | 39.80 | 37.00 | 59.00 25.00 |
| 120.01 - 130.00 | 12.55 | 11.50 | 400.01 - 410.00 | 40.80 | 37.50 | 60.50 26.00 |
| 130.01 - 140.00 | 13.60 | 12.50 | 410.01 - 420.00 | 41.80 | 38.00 | 62.00 26.50 |
| 140.01 - 150.00 | 14.60 | 13.50 | 420.01 - 430.00 | 42.80 | 39.00 | 63.50 27.50 |
| 150.01 - 160.00 | 15.60 | 14.00 | 430.01 - 440.00 | 43.80 | 40.00 | 65.00 28.00 |
| 160.01 - 170.00 | 16.60 | 15.00 | 440.01 - 450.00 | 44.80 | 41.00 | 66.50 28.50 |
| 170.01 - 180.00 | 17.60 | 16.00 | 450.01 - 460.00 | 45.80 | 42.00 | 68.00 29.00 |
| 180.01 - 190.00 | 18.60 | 17.00 | 460.01 - 470.00 | 46.80 | 43.00 | 69.50 30.00 |
| 190.01 - 200.00 | 19.60 | 18.00 | 470.01 - 480.00 | 47.80 | 44.00 | 71.00 30.50 |
| 200.01 - 210.00 | 20.60 | 19.00 | 480.01 - 490.00 | 48.80 | 45.00 | 72.50 31.00 |
| 210.01 - 220.00 | 21.60 | 20.00 | 490.01 - 500.00 | 49.80 | 46.00 | 74.00 32.00 |

ON ORDERS OVER \$500.00 - WRITE FOR DETAILS
Terms chart prepared by D. J. Moffo, Heath Co., Benton Harbor, Michigan

TIME PAYMENT AGREEMENT

NOTE: Time payment agreement cannot be accepted from persons under 21 years of age. If you are under 21, have this form filled out by a person of legal age, regularly employed or engaged in business. He can make the purchase for you, and will be responsible for payment.

TO: HEATH COMPANY, BENTON HARBOR, MICHIGAN

Enclosed is a deposit of \$_____ on the Easy Payment cost of the equipment on the Order Blank. I will pay \$_____ each month to you at the above address starting 30 days after shipment until the total of payments is made.

This agreement provides for a series of credit sales by Heath of merchandise for my personal use. In accordance with Heath's established terms, **FINANCE CHARGE** will be computed only on each new purchase and the amount financed plus the **FINANCE CHARGE** of each new purchase will be added to my existing outstanding balance.

Until each item is fully paid for, I agree that: I have risk of loss or damage; I will not sell, transfer possession of, remove or encumber the property without your written consent; upon default on the terms of this agreement, you may declare my existing outstanding balance due and payable and you may repossess the property. My installments shall be applied as follows: In case of items purchased on different dates, the first purchased shall be deemed first paid for; In the case of items purchased on the same date, the lowest priced shall be deemed first paid for. This contract is to be governed by the laws of the State of Michigan.

Date: _____

Sign Here X _____

CREDIT APPLICATION

(Please Print)
IMPORTANT: Please fill in completely. Omissions and errors cause delays. SIGN TIME PAYMENT AGREEMENT ABOVE.

| TERMS DESIRED | |
|---------------|--------|
| 12 mo. | 18 mo. |

| ABOUT HEAD OF HOUSEHOLD | Single | Married | Divorced | Separated | No. Dependents | Area Code | Home Phone | Age | Social Sec. No. | If Service man, Serial No. |
|-------------------------|--------|---------|----------|-----------|----------------|-----------|------------|-----|-----------------|----------------------------|
| Mr. Mrs. Miss | | | | | | | | | | |

First Name _____ Initial _____ Last Name _____
Address _____ City _____ State _____ Zip _____ Years At _____

Previous Address (If at present address less than 2 years) If Military, Permanent Mailing Address

Occupation _____ Employer _____

Employer Address _____ Previous Employer (if less than 2 yrs. with present employer) _____

| ABOUT YOUR WIFE | First Name | Occupation |
|-----------------|------------|------------------|
| Employer | | Employer Address |

| PERSONAL DATA | Rent | Own | Board | Trailer | Other | Head of Household's Income Per Month | Wife's Income Per Month | Other Income Per Month |
|---------------------------------------|------|-----|-------|---------|-------|--------------------------------------|-------------------------|------------------------|
| Rent or Mortgage Payment Per Month \$ | | | | | | \$ | \$ | \$ |

Name of Nearest Relative (with whom not residing)

Relative's Address

Name of Bank _____ Branch _____

Type of Account Checking Savings Loan

Previous Heath Account: Yes No If Yes Give Acct. No.

| Other Credit Accounts | | Balance | Monthly Payments | Account Number |
|-----------------------|--|---------|------------------|----------------|
| Name | | | | |
| Address | | | | |
| Name | | | | |
| Address | | | | |
| Name | | | | |
| Address | | | | |

Heathkit Catalogs for your friends...

Everyone interested in electronics will want the new Heathkit Catalog — it's the world's biggest kit catalog!

We'll be happy to send your friends their own personal catalogs.

NY

122

R. MICHIGAN TELEX 72-9421

PLEASE DO NOT WRITE IN THIS SPACE

THIS YOUR FIRST ORDER? YES NO
no, list year of last purchase date: _____

What new Heathkits would you like us to make? _____

you have moved since your last order, please give FORMER ADDRESS here

Address _____

City _____ State _____ Zip _____

Name _____

Address _____

City _____ State _____ Zip _____

Name _____

Address _____

City _____ State _____ Zip _____

00/01 10 TOTAL FOR MERCHANDISE. \$

Indicate ordered from catalog, please list _____

Amount for Parcel Post. Do not remit for Express/Motor Freight charges. (shipping charges).

Allowance if offered.

CASH PRICE

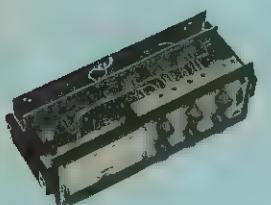
Heathkit® Value-Engineered Test Equipment



Heathkit IM-25 Solid-State V-O-M

• 9 DC voltage ranges from 150 millivolts full scale to 1500 volts full scale
• 9 AC voltage ranges from 150 millivolts full scale to 1500 volts full scale
• 7 resistance ranges, 10 ohms center scale x1, x10, x100, x1k, x10k, x100k, x1 meg . . . measures from one ohm to 1000 megohms • 11 current ranges from 15 uA full scale to 1.5 A full scale • 11 megohm input impedance on DC
• 10 megohm input impedance on AC • AC response to 100 kHz • Separate range switch for each test function • Built-in 120/240 VAC, 50-60 Hz power supply plus in-cabinet holders for batteries • Circuit board assembly • Not recommended for use in RF fields

Kit IM-25, 11 lbs. \$85.00
Assembled IMW-25, 11 lbs. \$120.00



Wired IMW-25
\$120.00

Unitized Construction. Circuit board mounts within the main frame. Cabinet shells are removable for convenient access to calibration controls and battery holders.



Heathkit IM-16 Solid-State Volt-Ohm-Meter

• 8 DC voltage ranges from 0.5 volts to 1500 volts full scale • 8 AC voltage ranges from 0.5 volts to 1500 volts full scale • 7 ohmmeter ranges x1 (with 10 ohms at center scale), x10, x100, x1k, x10k, x100k, and x1 megohm
• 11 megohm input resistance on DC ranges 1 megohm on AC ranges
• Operates either from internal battery or from 120/240 V, 50/60 Hz AC line voltage • Separate switches for individual functions • Circuit board-wiring harness construction speeds assembly, means less chance for wiring error • Cabinet top & bottom shells remove easily to expose circuitry and components

Kit IM-16, 10 lbs. \$46.95
Assembled IMW-16, 11 lbs. \$69.95

IM-16 SPECIFICATIONS—DC VOLTmeter—8 Ranges: 0.5, 1.5, 5, 15, 50, 150, 500, 1500 volts. Input resistance: 11 megohms on all ranges. Accuracy: $\pm 3\%$ of full scale. AC VOLTMETER—8 Ranges: 0.5, 1.5, 5, 15, 50, 150, 500, 1500 mA full scale. Input resistance: 0.1 ohm (1500 mA) to 10 ohm (0.015 mA). Accuracy: $\pm 4\%$ of full scale. AC OHMMETER—7 Ranges: 0.15, .05, .15, .5, 1.5, 5, 15, 50, 150, 500, 1500 ohms full scale. Input resistance: 10 megohm shunted by 150 pF (measured at probe tip). Accuracy: $\pm 5\%$ of full scale. Frequency response: ± 2 dB, 10 Hz to 100 kHz. AC MILLIAMMETER—11 Ranges: 0.015, .05, .15, .5, 1.5, 5, 15, 50, 150, 500, 1500 mA full scale. Input Resistance: 0.1 ohm (1500 mA) to 10 ohm (0.015 mA). Accuracy: $\pm 5\%$ of full scale. OHMMETER—7 Ranges: 10 ohm center scale x1, x10, x100, x1k, x10k, x100k, x1 megohm. Terminal voltage 70 mV (not sufficient to cause diode junction conduction). Probe: Combined AC-OHMS-DC switching probe, single jack input for Probe and Ground connections. Circuit ground isolated from cabinet. Dividers: 1% Precision Type. Meter: 6", 200 μ A, 100° movement. Transistors & Diodes: (2) 2N4304 FET-transistor, (1) 2N393 silicon junction transistor, (1) 9.1 V zener diode, (1) 13 V zener diode, (4) TN191 germanium diode, (1) silicon Power Supply diode. POWER SUPPLIES—Ohms circuits: 3 volts ("C" cells). Ohms circuit bias: 1.35 volt (EIN mercury cell). Amplifier circuit: 18 volts. Battery operation: "C" cells. Line operation: Transformer operated 1/2 wave circuit, operable on either 120 or 240 V AC, 50-60 Hz. Dimensions: 16 1/2" W x 5 1/2" H x 7 3/4" D.

Kit IM-16, 10 lbs. \$46.95
Assembled IMW-16, 11 lbs. \$69.95

IM-16 SPECIFICATIONS—DC VOLTmeter—8 Ranges: 0.5, 1.5, 5, 15, 50, 150, 500, 1500 volts. Input resistance: 11 megohms on all ranges. Accuracy: $\pm 3\%$ of full scale. AC VOLTMETER—8 Ranges: 0.5, 1.5, 5, 15, 50, 150, 500, 1500 volts. Input resistance: 1 megohm. Accuracy: $\pm 5\%$ of full scale. OHMMETER—7 Ranges: x1 (10 ohm center scale), x10, x100, x1k, x10k, x1 megohm. Terminal voltage 70 mV (not sufficient to cause diode junction conduction). Input—probe with shielded cable: AC-Ohms/DC switch in probe. (Single plug for probe & common connections.) Circuit ground isolated from cabinet. POWER SUPPLIES—Amplifier circuit: Power line, 120/240 V, 50/60 Hz, AC. Battery: 9 V. NEDA 1602 or equivalent. Ohms circuit: Battery: 1.5 V (one "C" cell). GENERAL SPECIFICATIONS—Voltage dividers: 1% precision resistors. Meter: 6", 100 μ A (100° movement). Transistor & diode complement: (1) Field effect transistor; (6) 2N393 silicon transistors; (1) 6.8 V. zener diode; (4) silicon diodes. Dimensions: 16 1/2" L x 7 3/4" D x 5 1/2" H. Net weight: 7 1/2 lbs. (with batteries).

Now Professional Beige & Brown Styling For The Heathkit IM-38 Laboratory AC VTVM

• Especially useful for low-level AC & audio measurements • 10 voltage ranges—from 0.01 to 300 volts RMS full scale • Extended frequency response, ± 1 dB from 10 Hz to 500 kHz • 10 megohm input impedance for high accuracy—minimal effect on circuitry under test • Calibrated scale for audio measurements • VU-type ballistic meter damping • New Heathkit instrumentation color styling • 120/240 volt wiring options—no special export order required

A Compact Instrument For Audio Design & Development, Laboratory Analysis, Or General Servicing . . . features the same practical size as the Heathkit IM-18 VTVM, plus precision components for extended accuracy in measuring low-level AC voltages. A precision voltage divider provides 10 ranges, 10 millivolts to 300 volts RMS full scale.

Optimum Circuit Design For Accurate, Dependable Measurements . . . utilizes the high input impedance characteristics of the cathode follower which reflects 10 megohms load to circuits under test. Total meter amplifier includes two stages and the amplifier filament voltage is supplied from a transformer winding balanced to ground to keep AC noise to a minimum. The DC power supply features a rugged silicon rectifier. New Heathkit "human engineered" instrumentation knobs and choice of 120/240 volt operation mean extra convenience and easier operation. Look no further for a top quality, low cost laboratory AC VTVM . . . kit or assembled, the IM-38 is your best buy.

Kit IM-38, 4 lbs. \$41.95
Assembled IMW-38, 5 lbs. \$57.95

IM-38 SPECIFICATIONS—Frequency response: ± 1 dB 10 Hz to 500 kHz, ± 2 dB 10 Hz to 1 MHz, all ranges. Ranges: Ten ranges from 0.01 to 300 volts RMS full scale. Decibels: Total range—52 to +58 dB, meter scale—12 to +2 dB (0 dB=1 mW in 600 ohms), ten switch selected ranges from —40 dB to +50 dB in 10 dB steps. Input impedance: 10 megohms shunted by 12 pF on ranges 10 to 300 volts, 10 megohms shunted by 22 pF on ranges .01 to 3 volts. Tube complement: (1) 6AW8, (1) 6E17/EF184. Accuracy: Within 5% of full scale. Power requirements: 105-125/210-250 VAC, 50-60 Hz, 10 watts. Dimensions: 7 1/2" H x 4 1/4" W x 4 1/4" D.

Kit IM-38, 4 lbs. \$41.95
Assembled IMW-38, 5 lbs. \$57.95

IM-38 SPECIFICATIONS—Frequency response: ± 1 dB 10 Hz to 500 kHz, ± 2 dB 10 Hz to 1 MHz, all ranges. Ranges: Ten ranges from 0.01 to 300 volts RMS full scale. Decibels: Total range—52 to +58 dB, meter scale—12 to +2 dB (0 dB=1 mW in 600 ohms), ten switch selected ranges from —40 dB to +50 dB in 10 dB steps. Input impedance: 10 megohms shunted by 12 pF on ranges 10 to 300 volts, 10 megohms shunted by 22 pF on ranges .01 to 3 volts. Tube complement: (1) 6AW8, (1) 6E17/EF184. Accuracy: Within 5% of full scale. Power requirements: 105-125/210-250 VAC, 50-60 Hz, 10 watts. Dimensions: 7 1/2" H x 4 1/4" W x 4 1/4" D.

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Kit IM-38, 4 lbs. \$41.95
Assembled IMW-38, 5 lbs. \$57.95

IM-38 SPECIFICATIONS—Frequency response: ± 1 dB 10 Hz to 500 kHz, ± 2 dB 10 Hz to 1 MHz, all ranges. Ranges: Ten ranges from 0.01 to 300 volts RMS full

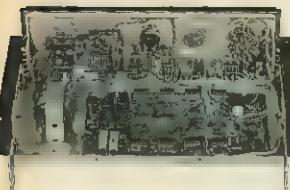


IG-28

\$79.95

Wired IGW-28

\$114.95



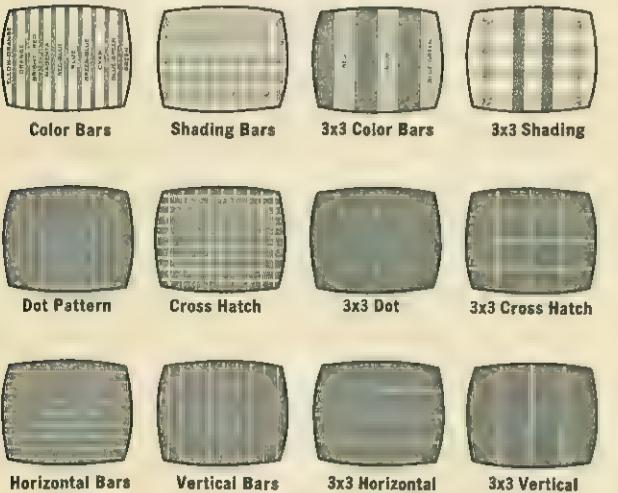
Clean, Open Layout . . . thanks to Heath's practical engineering and the use of space and weight saving IC's. The Video circuit board is upper left, Divider board mounts on the chassis.

Fast Switch Selection Of Either

Standard 9 x 9
Display

OR

Exclusive Heath
"3 x 3" Display



IG-52

\$69.95

TV Alignment Generator For FM & TV "Front End" And IF Alignment

Kit IG-52, 14 lbs.
Export model available for 115/230 VAC, 50-60 Hz; write for prices.

IG-52 SPECIFICATIONS—Output impedance: 50 ohms. Sweep deviation: Continuously variable from 0.4 MHz to 0.42 MHz (depending on base frequency). Crystal marker: 4.5 MHz and multiples thereof. Variable marker: 19 MHz to 60 MHz on fundamentals, 57 MHz to 180 MHz on harmonics. External marker terminals: Provided on panel. Attenuators: Step-switch controls sweep and marker oscillators together, plus variable controls for each output. Blanking: Converts return trace into zero reference line, phasing control also provided. Cables: 3 supplied, output, scope horizontal, scope vertical. Power requirements: 105-125 VAC, 50/60 Hz, 50 watts. Dimensions: 13" W x 8 1/2" H x 7" D.

NEW! Sine-Square Wave Generator . . . High Accuracy . . . Low Cost

• Output available from 1 Hz to 100 kHz using repeatable switch-selection • Sine & Square Wave output available simultaneously • Metered sine wave output • Less than 0.1% sine wave distortion • Voltage & dB meter scales • Switch-selection of internal 600 ohm load or external load • Less than 50 ns square wave rise time • Floating outputs 8-position output attenuator for sine waves • 3-position output attenuator for square waves • 120 V or 240 V wiring options • New Heathkit instrumentation styling and unitized construction for easier operation & servicing • Simple circuit board construction

Kit IG-18, 10 lbs.
Assembled IGW-18, 9 lbs.

IG-18 SPECIFICATIONS—GENERAL: Frequency selection: Digital selection consisting of: 0-100, 100, 1000. Frequency accuracy: Within $\pm 5\%$. SINE/WAVE OUTPUT: Frequency range: 1 Hz to 100 kHz. Output voltage ranges: 8 ranges, 0.003 to 10 volts RMS (full scale) with 10 K ohm or higher external load. 6 ranges, 0.003 to 1 volt (full scale) with 600 ohm internal or external load. dB Ranges: -62 dB to +22 dB, -12 dB to +2 dB on the meter and -50 dB to +20 dB on the amplitude switch in 10 dB steps. +2 dB maximum into 600 ohm load. (0 dB = 1 mw in 600 ohm). Output variation: ± 1 dB 10 Hz to 100 kHz. Output indication: Two voltage and one dB scale on meter. Output impedance: 10 volt range: 0-1000 ohm; 3 volt range: 800-1000 ohm; 1 volt range and lower: 600 ohm. Meter accuracy: $\pm 5\%$ of full scale with proper load termination. Distortion: Less than 0.1% from 10 Hz to 20 kHz. Type of circuit: Differential amplifier with complementary-pair output. Notch filter frequency determination. SQUARE WAVE OUTPUT: Frequency range: 5 Hz to 100 kHz. Output voltage ranges: (peak-to-peak): Three ranges: .1, 1, 10 volt into 2000 ohm load or higher. Output impedance: .1 V and 1 V ranges: 52 ohm; 10 V range: up to 220 ohm. Rise time: Less than 50 ns. Dimensions: 5 1/4" H x 13 1/4" W x 7" D. Power requirements: 105-125 VAC or 210-250 VAC, 50/60 Hz, 6 watts. Net weight: 7 lbs.

Kit IG-18
\$67.50

Wired IGW-18
\$99.50

Heathkit® "Performance-Plus"

The New Heathkit IG-28

Color Bar-Dot Generator . . .

Advanced Integrated Circuitry Produces 12 Patterns

Plus Clear Raster and Eliminates

Divider Chain Instability Forever

• All solid-state construction using computer-type integrated circuitry • No divider chain adjustments • Stable pattern display—no flicker, bounce or jitter • Instant switch selection of all functions • Produces 12 patterns plus clear raster • Exclusive Heath 3x3 display plus standard 9x9 display of all patterns • Variable front panel tuning for channels 2 thru 6 • Horizontal lines only one raster thick for added accuracy • Variable front panel positive and negative video output • Front panel negative going sync output • Two handy AC outlets on front panel • Built-in gun shorting circuit with lead piercing connectors • Front panel switchable crystal controlled sound carrier • Copper-banded transformer to reduce stray fields • Safe three-wire line cord • Fast, easy construction with two circuit boards and two wiring harnesses

The new IG-28 is the signal source for all color and B&W TV servicing. No other instrument at any price will give as much stable, versatile TV servicing capability. Here are the details:

Solid-State Circuitry produces dots, cross-hatch, vertical and horizontal bars, color bars and shading bars in the familiar 9x9 display . . . plus exclusive Heath 3x3 display of all these patterns . . . plus a clear raster that lets you adjust purity without upsetting AGC adjustment. Fifteen J-K Flip-Flops and associated gates count down from a crystal controlled oscillator, eliminating divider chain instability and adjustments.

Time-Saving Versatility. The IG-28 has variable front panel tuning for channels 2 through 6 for real convenience. Plus & minus going video signals at the turn of a front panel control. And for sync, in-circuit video or chroma problems, use the front panel sync output. Two front panel AC outlets for test gear, TV set etc. Built-in gun shorting circuits and grid jacks too. Add any service-type scope with horizontal input and you have vectorscope display capability as well. Fast, enjoyable circuit board-wiring harness construction. Start enjoying the versatility and convenience you couldn't get before . . . put the remarkable new Heathkit IG-28 on your bench now.

Kit IG-28, 8 lbs. \$79.95
Assembled IGW-28, 8 lbs. \$114.95

IG-28 SPECIFICATIONS—Patterns: Switch Selection of 3x3 or 9x9 Display: Dots, Cross-hatch, Horizontal Lines, Vertical Lines, Color Bars, Gray Scale, Clear Raster. Output Signals: Video—Greater than ± 1 volt peak-to-peak composite signal for composite signal injection behind the video detector. RF—Variable to 50,000 uV output, channels 2 through 6, for composite signal injection into the receiver antenna input terminals. Sync—Greater than 3.5 volts peak-to-peak signal for servicing sync circuits without video, or sets having separate video and sync demodulators. Control Grids (3)—Individual red, blue, and green control grid signals for viewing chroma signal demodulator phase adjustments. Power Supply: Type—Transformer operated, full-wave zener diode regulated. Input—120 or 240 VAC, 50/60 Hz. Output—3.6 VDC, 500 mA, zener diode regulated. General: Cabinet Dimensions—Overall: 13 1/4" wide x 5 1/2" high x 8" deep. Net Weight—6 1/2 lbs.



Kit IG-18

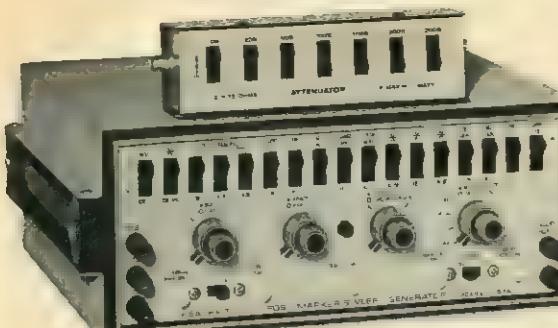
\$67.50

Wired IGW-18

\$99.50

The extremely clean, uncluttered layout of the IG-18 makes building it a pleasure.

Test Equipment



Kit IG-57A

\$135.00

Wired IGW-57A

\$199.00



Increase Your Profit . . . Decrease Your Alignment Time & Costs . . . With The New IG-57A Solid-State Post-Marker/Sweep Generator . . . Now With Video Sweep Modulation & Two Bias Supplies

• Unsurpassed value leader in TV alignment instruments • New video sweep modulation capability means faster, more accurate alignment of every TV set on the market • Exclusive Heathkit external attenuator with 7 shielded switches for up to 70 dB attenuation • Produces all the most used alignment frequencies for TV IF, color bandpass, FM IF and VHF channels 4 & 10 • Comprehensive manual with a liberally illustrated application section covers alignment of color and B&W TV and FM IF • Post-injection marker circuitry • 15 crystal-accurate markers • Three sweep oscillators cover the five most-used frequency ranges • Proven saturable reactor circuitry for dependable, linear sweep signals • 400 Hz modulation of all markers for easiest trap alignment • Hi-Z trace amplifier extends your scope sensitivity—provides up to 8 dB gain for weak signals • Phase control matches IG-57A to any scope • Switchable retrace blanking for easy phase control adjustment • Trace reverse function for proper marker sequence • Two variable DC bias supplies for positive or negative bias • Quick-disconnect BNC connectors • Complete with 4 coaxial cables, 4 test leads and demodulation probe • Unmatched by instruments costing hundreds of dollars more

Dependability-Proven . . . by major color TV manufacturers in their training clinics & service centers . . . by thousands of technicians and servicemen. Professionals can't afford to take a chance . . . so they bought the fastest, most accurate & economical instrument available. You can have these advantages too . . . with the new IG-57A. Here's why . . .

Now Complete Any Alignment Job Quickly & Successfully . . . a scope, a VTVM and the IG-57A are all you need to align virtually any B&W or color receiver on the market. You can check the overall receiver frequency response from the antenna terminals through the tuner, IF strip, video detector, to the color bandpass amplifier outputs. New circuitry provides sweep-modulated picture carriers . . . not only at 45.75 MHz for the tuner mixer input, but also 67.25 MHz for the antenna terminal input. The exclusive Heathkit external attenuator enables you to set bandwidth accurately in seconds . . . eliminates guessing important 6 dB amplitudes.

15 Crystal-Controlled Markers . . . 4 for color bandpass, 1 for FM IF, 8 for TV IF frequencies from 39.75 to 47.25 MHz . . . plus markers for channels 4 & 10 picture and sound carriers. Lets you accurately locate picture and sound carriers, 6 dB points and trap locations.

3 Sweep Oscillators . . . in stable Colpitts circuits produce 5 ranges using harmonics . . . for color bandpass, FM IF, Video IF bandpass, VHF channels 4 & 10.

Compact Size . . . Convenient Controls. The new IG-57A measures only 13 1/4" W x 5 1/2" H x 12" D . . . doesn't waste valuable bench space. The front panel controls are easy to read, easy to use . . . there are no gadgets, gimmicks or graphs to distract you. Put this new total capability Marker/Generator on your bench now . . . and discover what thousands of servicemen already know—that excellent alignment facilities don't have to be expensive. Order your Heathkit IG-57A today.

Kit IG-57A, 14 lbs. \$135.00
Assembled IGW-57A, 11 lbs. \$199.00

IG-57A SPECIFICATIONS—Marker frequencies: 100 kHz. Marker frequencies, crystal-controlled: 3.08, 3.58, 4.08, and 4.50 MHz $\pm 0.1\%$; 10.7, 39.75, 41.25, 42.17, 42.50, 42.75, 45.00, 45.75, 47.25, 67.25 and 193.25 MHz $\pm 0.05\%$. Modulation frequency: 400 Hz. Input impedance: External Marker/Sweep, and Attenuator—75 ohms. Trace In—220 k ohms. Output impedance: Marker Output, Sweep Output, and Attenuator—75 ohms. Scope: Vert.—1 k ohms. Bias Voltage: Two individually adjustable supplies; Positive or negative polarity. Type of Marker: Birdie. Controls: Bias controls; Marker/Trace—dual concentric; Sweep Width/Sweep Center—dual concentric; Marker Out—concentric with Sweep Range switch; and Phase. Switches: Rocker type—separate switch for each of the above listed frequencies; Blanking; On/Off; Trace Reverse; Modulation On/Off. Sweep frequency ranges and output voltage: LO Band—2.5 to 5.5 MHz ± 1 dB at 0.5 volts RMS (min.) fundamentals, and 10.7 MHz on harmonics. RF band—64 to 72 MHz ± 1 dB at 0.5 volts RMS (min.) fundamentals and 198 MHz on harmonics. Attenuator: Total of 70 dB of attenuation in seven steps—1 dB, 3 dB, 6 dB, 10 dB, 10 dB, 20 dB and 20 dB. Power requirements: 120 volts, 60 Hz AC at 4.5 watts.



Kit IG-37, 12 lbs. \$79.95

Heathkit IG-37 FM Stereo Generator

IG-37 SPECIFICATIONS—RF Signal frequency: 100 MHz adjustable by approx. ± 2 MHz. Pilot modulating frequency: 19 kHz ± 2 Hz. FM Modulation: Left channel (stereo), right channel (stereo), Phase Test (left plus right channel in phase), Monophonic FM. Deviation: Adjustable to 75 kHz. Sweep rate: (used for RF and IF alignment) 60 Hz. Sweep width: (used for RF and IF alignment) Adjustable to 750 kHz. RF Attenuator range: 60 dB in 20 dB steps. Crystal-controlled markers: 10.7, 90.95, 96.30, 101.65, & 107 MHz. Composite Signal output: Left channel (stereo); Right channel (stereo). Phase test (left plus right channels in phase). Audio output: 400, 1000, & 5000 Hz; 19 kHz (± 2 Hz); 38 kHz & SCA (65 or 67 kHz). Distortion: (At 400, 1000 & 5000 Hz) Less than 5%. Front panel controls: Pilot level control, function level control, function switch, frequency switch, RF frequency adjust, & RF attenuator switches. Power requirements: 105-125, 210-230 volts AC, 50/60 Hz, 35 watts. Dimensions: 5 1/2" W x 9" H x 13 1/2" D.

Heathkit IM-48 Audio IM Analyzer



IM-48

\$69.00

• Combines AC VTVM, Wattmeter & IM analyzer functions • Built-in high & low frequency signal sources for IM tests • Built-in 4, 8, 16 & 600 ohm load resistors • AC VTVM reads to 300 volts RMS . . . dBm from -65 to +52 • Checks power to 25 W continuous, 50 W intermittent • IM reads to 1, 3, 10, 30 & 100% full scale • 120/240 VAC operation • New Heathkit styling • Complete instructions included

• \$69.00

Kit IM-48, 13 lbs. \$69.00
IM-48 SPECIFICATIONS—Frequency response—AC VTVM: 10 Hz to 100 kHz ± 1 dB. Wattmeter: 10 Hz to 50 kHz ± 1 dB. I.M. Analyzer high pass filter: 2000 Hz to 12,000 Hz. I.M. Analyzer low pass filter: 10 Hz to 600 Hz. AC VTVM Range: .01, .03, .1, .3, 1, 3, 10, 30, 100, 300 volts RMS full scale. dBm: -40, -30, -20, -10, 0, +10, +20, +30, +40, +50. Reads from -65 to +52 dBm. Wattmeter: 0.15 mW, 1.5 mW, 15 mW, 150 mW, 1.5 W, 15 W, 150 W, full scale. Maximum continuous power 25 watts, intermittent power to 50 watts. I.M. Analyzer: 1%, 3%, 10%, 30%, 100% full scale. Input impedance—AC VTVM: 1 megohm or 4, 8, 16 or 600 ohm switch selected. I.M. Analyzer: 1 megohm or 4, 8, 16 or 600 ohm switch selected. Wattmeter: 4, 8, 16 or 600 ohm internal load, 10,000 ohm across external load. Output impedance—low and high frequency output: 3000 ohm (600 ohm when shunted with 750 ohm resistor). Internal generator frequencies—low frequency, 50/60 Hz (line frequency); High frequency, approximately 6 kHz. Accuracy—AC VTVM and wattmeter: Within 5% of full scale. I.M. Analyzer: Within 10% of full scale. Power requirements: 105-125 or 210-250 VAC, 50/60 Hz, 20 watts. Dimensions: 13" W x 8 1/2" H x 7" D.



IM-58

\$65.00

• Reads harmonic distortion directly to 1, 3, 10, 30 & 100% full scale • Frequency range 20-20,000 Hz • Reads RMS volts to 1, 3, 10 & 30 volts full scale • Measures noise levels down to -60 dBm on a separate meter scale • 300 k ohm input impedance • 1% precision resistors used in the VTVM voltage divider for greater accuracy • New Heathkit styling • 120/240 VAC operation

Accurately Measures Harmonic Distortion At Any Frequency Between 20 Hz And 20,000 Hz. With a signal source such as the IG-72 Audio Generator, the IM-58 indicates the residual signal in an amplifier after the fundamental frequency has been suppressed. Gives an accurate, dependable reading of hum, noise and harmonic distortion.

Kit IM-58, 13 lbs. \$65.00
IM-58 SPECIFICATIONS—Frequency: 20 Hz to 20,000 Hz in three ranges. Distortion: 1, 3, 10, 30, 100% full scale. Voltmeter: 1, 3, 10, 30, 100% full scale. Input resistance: 300 k ohm. Minimum input voltage for distortion measurements: 0.3 volts. Output voltage for monitoring: 2.5 volts at full scale meter reading. Accuracy: Voltmeter, $\pm 5\%$; Distortion, $\pm 5\%$ of full scale. +0.1% distortion. Tube complement: OA2, 6X4, 5879, 12AT7, 12AX7, 12BY7. Power Requirements: 105-125 or 210-250 VAC, 50-60 Hz, 30 watts. Dimensions: 13" W x 8 1/2" H x 7" D.



IP-28
\$47.50

Heathkit IP-28 1-30 VDC Regulated Power Supply . . .
Adjustable Current Limiting . . . Only \$47.50

IP-28 SPECIFICATIONS—Voltage output: 2 ranges; 1-10 and 1-30 VDC, continuously adjustable. Load regulation: Less than 50 mV variation from no load to full load (at front panel terminals) without remote sensing. Less than 20 mV variation from no load to full load at front or rear panel terminals when using remote sensing. Line regulation: Less than 25 mV variation in output voltage for 10% change in line voltage. Ripple & noise: Less than 5 mV. Current output: 1A maximum continuous load. Current limiting: 2 ranges; 10-100 mA & 10 mA-1A, continuously adjustable. Transient response: 25 μ s. Output impedance: 0.3 ohms or less to 100 kHz. Meter accuracy: 3% of full scale. Meter ranges: One switch determines voltage or current reading. 2 voltage ranges; 0-10 V, 0-30 V. 2 current ranges; 0-100 mA, 0-1A. External programming: AC or DC programming. 5000 ohm load on DC. Power requirements: 105-125 or 210-250 VAC, 50/60 Hz, 50 watts, at full load. Dimensions: 10 $\frac{1}{4}$ " W x 4 $\frac{1}{4}$ " D x 6 $\frac{1}{2}$ " H overall. Net weight: 6 $\frac{1}{2}$ lbs.

Kit IP-28, 9 lbs. \$47.50



EU-40A
\$90.00

New Heath/Malmstadt-Enke Solid-State Regulated HV Power Supply

• 50 to 300 VDC output • 20 mA current limiting • Overcurrent indicator light • 6.3 VAC output for filaments • Output regulated to 1% • Less than 50 mV ripple & noise • Output available at 5-way binding posts and octal socket • Suitable for all tube circuits & SCR's, thyatrons, HV transistors, etc. • Fully compatible with M-E Lab & new EU-51A System

Assembled EU-40A, 7 lbs. \$90.00

EU-40A SPECIFICATIONS—DC POWER SUPPLY: Output voltage: 50-300 DC, in 50 volt steps with each step continuously variable over 50 volt range. Output current: 0-20 mA regulated. 25 mA with output shorted. Regulation: 1% no load to full load. 0.5% with line voltages between 105 and 125 volts (or 210 to 250 volts). Ripple and noise: 50 mV maximum with either side of output to ground. Output impedance: Less than 0.5 ohm/V. Temperature range: 10 degrees C to 40 degrees C. 50 degrees F to 104 degrees F. AC POWER SUPPLY: Output voltage: 6.3 volts AC, center tapped. Output current: 1 ampere. GENERAL: Power requirements: 105-125 volts, or 210-250 volts, 50/60 Hz, 21 watts maximum at full load. Dimensions: 5" H x 8 $\frac{1}{4}$ " W x 7 $\frac{1}{4}$ " D. Weight: 4 $\frac{1}{4}$ lbs.

New Heath/Malmstadt-Enke Regulated Solid-State LV Power Supply

• Variable output from 0-15 VDC • Adjustable current limiting from 35-750 mA • Overcurrent indicating light • Output regulated to 0.02% • Stable at 0.02% in 8 hrs. • External programming feature • Output available at 5-way binding posts or octal socket • Fully compatible with M-E Lab and new EU-51A System

Assembled EU-41A, 6 lbs. \$50.00

EU-41A SPECIFICATIONS—Output voltage: 0-15 volts DC, continuously variable. Output current: 0-750 mA. Current limiting: 35-750 mA continuously variable. Current limit indicator: Lights when the preset current level is exceeded. Regulation: $\pm 0.02\%$ with line voltages between 105 and 125 volts (or 210 to 250 volts) or load current from 0-750 mA. Ripple: 0.2 mV RMS. Stability: $\pm 0.02\%$ for 8 hours. Temperature range: 10 degrees C to 40 degrees C. Temperature coefficient of voltage: $\pm 0.01\%$ per degree C. External programming: Output to input voltage ratio is adjustable from 0 to 1.2:1. Input impedance is 8,000 ohms. Power requirements: 105-125 volts, or 210-250 volts, 50/60 Hz, 55 watts maximum at full load. Dimensions: 5" H x 8 $\frac{1}{4}$ " W x 7 $\frac{1}{4}$ " D. Weight: 4 $\frac{1}{4}$ lbs.

Low Cost Heathkit IP-18 Solid-State 1-15 VDC Power Supply

• Adjustable current limiting • Output up to 500 mA continuous at 1-15 VDC • AC and DC programming inputs • "Floating" output for either positive or negative ground • Darlington pair voltage regulation circuit • Simple circuit board construction • Compact size • So low in cost you can afford one for positive supply, one for negative supply • Requires VOM for adjustment

Kit IP-18, 5 lbs. \$21.95

IP-18 SPECIFICATIONS—Voltage output: 1-15 VDC, continuously adjustable. Load regulation: Less than 50 mV variation from no load to full load. Line regulation: Less than 50 mV change in output voltage for a 10% change in line voltage. Ripple and noise: Less than 5 mV. Current output: 500 mA maximum continuous load. Current limiting: Adjustable from 10 mA to over 500 mA. Transient response: 25 microseconds. Output impedance: .5 ohm or less to 100 kHz. Power requirements: 105-125 or 210-250 VAC, 50/60 Hz, 15 watts at full load. Dimensions: 5 $\frac{1}{2}$ " W x 4 $\frac{1}{4}$ " H x 5 $\frac{1}{4}$ " D. Net weight: 3 $\frac{1}{4}$ lbs. Programming: AC or DC, 5000 ohm input resistance.

Heathkit IP-17 Variable Regulated High Voltage Supply

• Furnishes 0-400 VDC B+ & -100 VDC Bias & filament voltages • Separate panel meters for B+ voltage & current • Isolated output terminals • Circuit board-wiring harness construction

Kit IP-17, 21 lbs. \$61.95

Assembled IPW-17, 18 lbs. \$95.00

IP-17 SPECIFICATIONS—Output: 0-400 volts regulated DC at 0-100 mA cont., 125 mA intermittent, 0 to -100 volts DC at 1 mA variable bias voltage, 6.3 volts AC at 4 amps., 12.6 volts at 2 amps (25 VA max. AC load), filament voltage. Regulation: Output variation less than 1% from no load to full load. Output variation less than 1% for a $\pm 10\%$ change of 117 V AC input. Ripple: Less than 10 millivolts RMS, ripple, jitter and noise. Output impedance: Less than 10 ohms, DC to 1 MHz. Meters: Voltmeter 0-400 V or 0-150 V; Milliammeter 0-150 mA. Power requirements: 105-125 V or 210-250 V, 50/60 Hz, 150 watts max. Dimensions: 5 $\frac{1}{2}$ " H x 13 $\frac{1}{4}$ " W x 11" D.

Heathkit IP-27 Solid-State Regulated Low Voltage Supply

• Provides 0.5 to 50 VDC with better than ± 15 mV regulation • Four current ranges • Adjustable current limiter • Immune to overload from transients • Can be calibrated from "outside" the case

Kit IP-27, 16 lbs. \$79.95

Assembled IPW-27, 14 lbs. \$125.00

IP-27 SPECIFICATIONS—Input: 105-125 volts or 210-250 volts, 50/60 Hz; 135 watts at full load (50 V, 1.5A). Output: 0.5-50 volts DC; 1.5 amps max. DC. Load regulation: ± 15 millivolts, can be adjusted for no change. Line regulation: For a 10% change in line voltage, less than .05% change. Ripple & noise: Less than 150 microvolts. Transient response: Less than 25 microseconds. Output impedance: Less than .075 ohms from DC to 10 kHz, less than .3 ohms 10 kHz & up. Overload protection: Current limiter & relay. Meters: 3 $\frac{1}{2}$ 1mA, 50 ohm. Current ranges: 50 mA, 150 mA, 500 mA, 1.5 A. Voltage ranges: 5V, 15V, 50V. Front panel controls: On/Off-Coarse voltage switch, Fine voltage adjust, Current range switch, Current limit adjust, Meter rocker switch, Reset Standby toggle switch. Output terminals: (3), plus (+), minus (-), chassis ground. Dimensions: 5 $\frac{1}{2}$ " H x 13 $\frac{1}{4}$ " W x 9" D.

Heathkit Battery Eliminator . . . A Versatile Low Voltage Supply

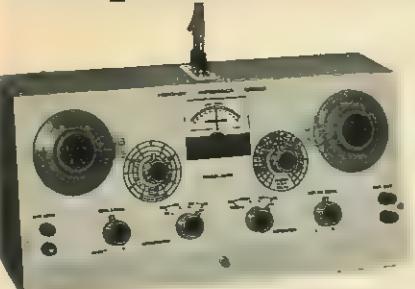
• Switch selection of 6 or 12 VDC • Filtered & unfiltered DC outputs • Less than 0.3% AC ripple • Separate meters for output voltage & current • Doubles as a battery charger • Heavy duty components

Kit IP-12, 18 lbs. \$52.95

IP-12 SPECIFICATIONS—Continuously variable output: 6 volt range: unfiltered, 10 amp continuous, 15 amp maximum; filtered, 5 amp continuous, less than .3% ripple. 12 volt range, unfiltered, 5 amp continuous, 7.5 amp maximum; filtered, 5 amp continuous, less than .3% ripple. Power requirements: 105-125 volts 50/60 Hz AC at 200 watts. Dimensions: 13" W x 8 $\frac{1}{4}$ " H x 7" D.

Heathkit® Test Equipment . . .

Unequalled Performance At An Unbeatable Price



IP-28
\$89.00

Heathkit Impedance Bridge

• Features the "New Look" of Heath instrumentation • Four separate bridge circuits to measure resistance, capacitance, low Q and high Q inductance • Easy operation and reading with the slanted control panel • Built-in generator and amplifier • Battery-type vacuum tube circuitry for fast warmup • 1/2% precision resistors and silver-mica capacitors for higher accuracy • Operates on 120 v. or 240 v., 50/60 Hz. • Requires headphones or scope for alignment

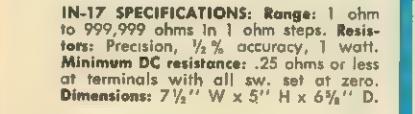
\$89.00



IN-17
\$27.95

Decade Resistance Box

1/2% resistors in 6 decades provide extremely accurate values from 1 ohm to 999,999 ohms in 1 ohm steps. Kit IN-17, 3 lbs. \$27.95



IN-27
\$18.95

Decade Capacitance Box

1% silver-mica capacitors provide very accurate capacitance values from 100 pF to 0.111 μ F in 100 pF steps. Kit IN-27, 3 lbs. \$18.95



IT-17
\$51.95

Low Cost Tube Checker

• Fills most daily service requirements • Tests most tube types including new compactrons, nuvistors, novars, and 10-pin miniatures • Multi-colored "Bad-Good" meter scale • Tube-data chart is built-in-can't be misplaced • Features constant-current free-rolling roll chart mechanism • Compact styling with carrying handle • Color-coded wiring harness simplifies point-to-point wiring • Requires AC VTVM for alignment

\$51.95

Kit IT-17, 12 lbs. \$51.95



TT-1A
\$160.00

Mutual-Conductance Tube Tester

• An outstanding array of features • Indicates Gm to 24,000 micromhos • Ultra-sensitive grid current test • Direct reading ohmmeter leakage test • Constant-current heater supplies • Built-in calibration circuit for high accuracy • Built-in roll-type tube data chart • Built-in adapter for testing compactron, nuvistor, novar, and 10-pin miniature tube types • Handsome leatherette covered carrying case



\$160.00

NEW SUBSCRIPTION SERVICE FOR REPLACEMENT TUBE DATA ROLL CHARTS
Updated replacement roll charts for all Heathkit tube checkers can be purchased either singly or on a subscription basis which assures a new roll chart plus two supplements per year.

Prices are \$3.00 per chart; \$4.50 for the new chart plus two supplements during the following year. Write to: Heath Tube Data Service, P.O. Box 377, Hewlett, Long Island, New York 11557.

Heathkit Capacitor Checker

• Provides complete analysis of all capacitor types • Direct reading scales—no involved calculations • Features low bridge voltage for safe testing of miniature electrolytics • 16 leakage testing voltages • Measures capacitance from 10 pF to 1,000 μ F • Measures resistance from 5 ohms to 50 megohms • Comparator circuit measures "L", "C" or "R" with external standard • Calibrated power factor control • "Eye" tube null & leakage indicator • Requires VTVM for alignment



IT-28
\$33.50

Kit IT-28, 7 lbs. \$33.50

IT-28 SPECIFICATIONS—Test Circuit: AC bridge, powered through special bridge transformer by the 50/60 Hz supply or by an external audio generator with 10 volts output. Upper frequency limit: 10 kHz. Capacitance: 4 Ranges: 10 pF to .005 μ F, .001 μ F to .5 μ F, .1 μ F to 50 μ F, 20 to 1000 μ F. Capacitor leakage: DC test voltages from 3 to 600 volts in 16 steps. Resistance: 3 Ranges: 5 ohms to 5000 ohms; 500 ohms to 500 K ohms; 50 K ohms to 50 megohms. Comparator circuit: External standard R, L, or C; Max. Ratio 25-1. Power supply: Transformer-operated, half-wave rectifier. Power requirements: 105-125 V or 210-250 V AC, 50/60 Hz, 30 watts. Dimensions: 9 $\frac{1}{2}$ " H x 6 $\frac{1}{2}$ " D.

• An ideal instrument for trouble-shooting solid-state and tube type AM receivers and audio equipment • Traces RF, IF and audio signals • Locates troublesome noisy or intermittent components • Convenient audio/RF probe with switch • High gain amplifier with adjustable level control • Safe . . . applies no voltage to circuit under test • Doubles as a test amplifier or speaker



IT-12
\$24.50

Kit IT-12, 6 lbs. \$24.50
Export model available for 115/230 VAC, 50-60 Hz; write for prices.

IT-12 SPECIFICATIONS—Power supply: Transformer operated. Power requirements: 117 volts 50/60 Hz AC, 25 watts. Tube complement: 12AX7, 12CA5, 1629. Speaker: 3 $\frac{1}{2}$ PM. Probe and test leads: 4" input lead for RF and audio with switch on probe body, 2-3' panel test leads with alligator clips. Dimensions: 4 $\frac{1}{2}$ " H x 7 $\frac{1}{2}$ " W x 4" D.

Heathkit® Performance-Plus 'Scopes

Professional DC Laboratory 'Scope . . . 8 MHz Response . . .

Triggered Sweep, Delay-Line Input

• A high stability 5" DC oscilloscope with triggered sweep • DC to 8 MHz bandwidth and 40 nanosecond rise time • Vertical signal delay through high linearity delay lines • Calibrated vertical attenuation • Calibrated time base • Forced air cooling • Input for Z axis modulation • Direct access to vertical deflection plates • Easy circuit board construction & wiring harness assembly • Wiring options permit 115/230 volt, 50-60 Hz operation—no special export order necessary

Kit IO-14, 53 lbs., Express or Motor Freight \$275.00
Assembled IOW-14, 47 lbs., Express or Motor Freight \$399.00
Assembled IOW-14S (with P7 phosphor), 47 lbs., Express or Motor Freight \$410.00

IO-14 SPECIFICATIONS—(Vertical) Sensitivity: 0.05 V/cm AC or DC. Frequency response: DC to 5 MHz—1 dB or less; DC to 8 MHz—3 dB or less. Rise time: 40 nsec (0.04 microseconds) or less. Input impedance: 1 megohm shunted by 15 pF. Signal delay: 0.25 microsecond. Attenuator: 9-position, compensated, calibrated in 1, 2, 5 sequence from 0.05 V/cm to 20 V/cm. Accuracy: $\pm 3\%$ on each step with continuously variable control (uncalibrated) between each step. Maximum input voltage: 600 volts peak-to-peak; 120 volts provides full 6 cm pattern in least sensitive position. (Horizontal) Time base: Triggered with 18 calibrated rates in 1, 2, 5 sequence from 0.5 sec/cm to 1 microsecond/cm with $\pm 3\%$ accuracy or continuously variable control position (uncalibrated). Sweep magnifiers: $\times 5$, so that fastest sweep rate becomes 0.2 microseconds/cm with magnifier on. (Overall time base accuracy $\pm 5\%$ when magnifier is on.) Triggering capability: Internal, external, or line signals may be switch selected. Switch selection of + or — slope. Variable control on slope level. Either AC or DC coupling. "Auto" position. Triggering requirements: Internal: 0.5 cm to 6 cm display. External: 0.5 volts to 120 volts peak-to-peak. Triggering frequency response: DC to 2.5 MHz approx. Horizontal input: 1.0 V/cm sensitivity (uncalibrated) continuous gain control. Bandwidth: DC to 200 kHz ± 3 dB. General: 5ADP31 or 5ADP2 Flat Face C. R. T. interchangeable with any 5AD or 5AB series tube for different phosphor characteristics. 4250 V. accelerating potential. 6 x 10 cm edge lighted graticule with 1 cm major divisions & 2 mm minor divisions. Power supply: All voltages electronically regulated over range of 105-125 VAC or 210-250 VAC 50/60 Hz input. Z axis input provided. DC coupled CRT unblanking for complete retrace suppression. Power requirements: 285 watts, 115 or 230 VAC 50/60 Hz. Cabinet dimensions: 15" H x 10 1/2" W x 22" D includes clearance for handle and knobs. Net weight: 40 lbs.

Assembled Low-Capacitance Scope Probe

• A necessary tool for high frequency waveform analysis • Minimizes signal loss due to circuit loading • Flip switch for x1 or x10 attenuation • DC to 25 MHz response • 600 volts DC maximum • Spring-loaded notched tip for safe, hands-free operation • For use with 1 megohm input scopes, such as Heathkit IO-14

Assembled PKW-2, 1 lb. \$12.00



Kit IO-14

\$275.00

Wired IOW-14

\$399.00

Kit IO-18
\$92.50

Wired IOW-18
\$149.95

Kit IO-17

\$79.95

Heathkit Compact 3" DC 'Scope

• Identical vertical & horizontal amplifiers • AC or DC coupling • DC to 200 kHz bandwidth—less than 5° relative phase shift • Recurrent 4 range sweep—5 Hz to 50 kHz • External capacitor binding posts for slower sweep rates • 0.1 volt sensitivity • Small—easy to carry

Kit IO-10, 16 lbs. \$99.95

Export model available for 115/230 volts AC, 50-60 Hz; write for prices.



General Purpose 3" 'Scope

• Identical vertical and horizontal amplifiers • 2 Hz to 200 kHz response • Wide range sweep generator—20 to 100 kHz • Automatic Sync, retrace blanking • Direct access to vertical deflection plates • Professional quality components throughout • Focus and astigmatism control • Clean, open circuit layout for easy construction

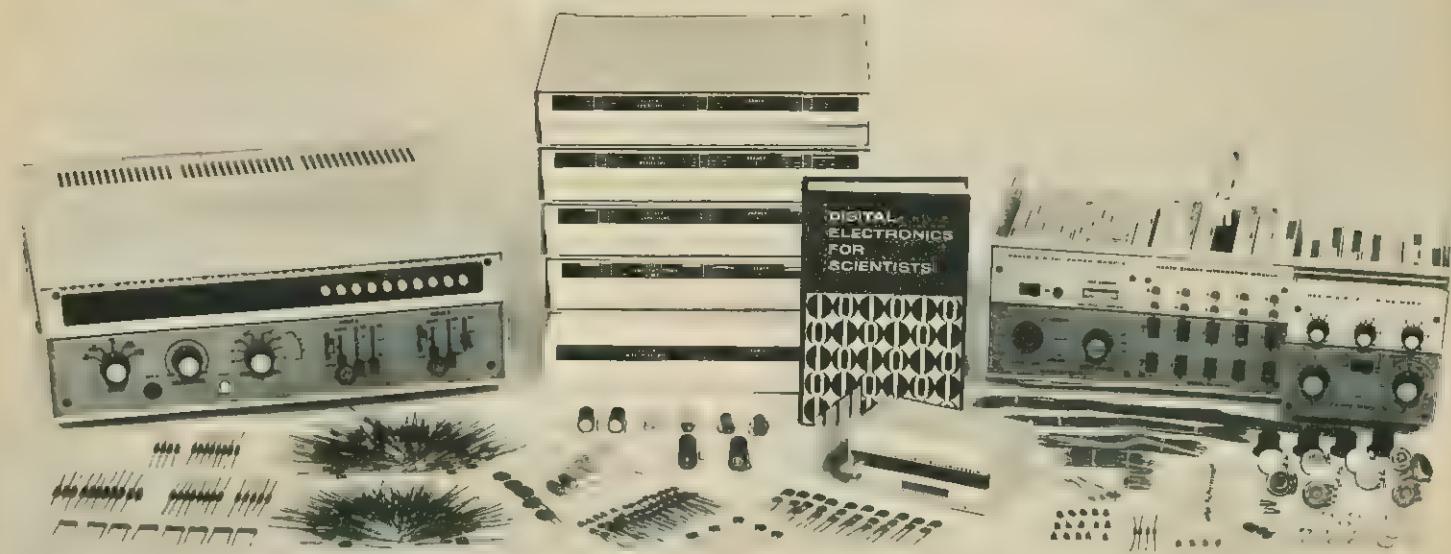
Kit IO-21, 12 lbs. \$61.95

Export model available for 115/230 volts AC, 50-60 Hz; write for prices.



Scientific Instrumentation

NOW! A Complete System to Make the Most Out of Digital Electronics



The Heath EU-800 Series Modular Digital System Including TTL IC Instruments, Modules, Circuit Cards, Breadboards, Parts and A New Text, "Digital Electronics For Scientists"

Now . . . Get The Most Out Of Digital And Analog Electronics . . . With The Heath EU-800 Series System . . . the system that is revolutionizing laboratory and classroom instrumentation around the world. The basic design concepts of Professors H. V. Malmstadt and C. G. Enke combined with the engineering talents of Heath's scientific instrument group have resulted in the unique Heath EU-800 Series. This versatile system uses solderless plug-in circuit cards (see below) and can perform equally well in constructing high performance research quality instruments, in performing hundreds of experiments in the teaching laboratory, in rapid testing of new concepts, in interfacing to computers, or in making precision measurements in virtually any field.

Start . . . By Learning The New Digital Electronics. Drs. Malmstadt and Enke have written a pioneering new text "Digital Electronics For Scientists" (published by W. A. Benjamin, Inc.) that provides a concise, systematic introduction to the digital concepts, circuits and systems that are basic to the new instrumentation-computation revolution. The book is written for engineering and science students and for practicing engineers, scientists and technicians so that all may effectively utilize the startling recent advances in digital electronics.

The reader is led from simple switching devices to the latest high speed integrated circuits and digital instrumentation systems. Table of contents by chapter includes: 1. Digital Measurements. 2. Switching Concepts and Diode Circuits. 3. Transistors, Relays and Other Switches. 4. Switching Logic and Logic Gates. 5. Flip-Flops and Multivibrators. 6. Counters, Registers and Readout. 7. Digital and Analog-Digital Instruments and Systems. Never before have the latest "state-of-the-art" methods been made so rapidly and conveniently accessible through the integrated combination of new text and versatile equipment. The experimental section of the text is written specifically to utilize the Heath EU-801A Analog Digital Designer (ADD™) and the EU-51A Experimental Parts Group, plus providing experience with and working knowledge of hundreds of digital and analog-digital circuits, instruments and systems.

ADD™ . . . Heath EU-801A Analog-Digital Designer includes three chassis modules (power, binary information and digital timing) and 13 plug-in circuit cards. Appropriate circuit cards are simply plugged into the modules and patched together with ordinary hookup wire or component leads to form basic circuits, systems or complex instruments. *No Soldering Is Required.*

Heath EU-51A Experimental Parts Group is a compact, inexpensive and extremely flexible breadboard system for electronic circuit design and teaching. The Group includes a Desk Top Chassis, Power Patch Card, Component Patch Card and hundreds of components. The 51A Chassis and 801A Modules both accept any-800 Series circuit card, and the 801A Power Module can be used as a power supply for the Group. Other power supplies can also be used, depending on your application. *Most of the experiments in "Digital Electronics For Scientists" can be performed with the EU-51A and EU-801A alone.*

Heath EU-53A "Stack-n-Patch" . . . uses the Desk Top Chassis, Power Patch Card and Component Patch Card of the EU-51A above for users who prefer to supply their own parts. Designing, teaching, experimenting are faster, more

convenient and less expensive than conventional breadboarding systems. Just choose the power supply that fits your applications and connect it to the Power Patch Card . . . Stack the Component and Power Patch Cards in the Chassis . . . patch power to the Component Card and you're ready. For IC work and other types of circuitry that can't be conveniently built on the Component Patch Card, Heath offers a wide variety of factory assembled cards to stack in the chassis . . . see below.

Expand Your Measurement Capability . . . with the Heath EU 805A Universal Digital Instrument. The 805A includes a DVM and six 12.5 MHz counting-timing functions . . . Frequency, Time Interval, Period, and Ratio Meters, Voltage Integrator and Events Counter. Most of the functional circuits in this highly versatile instrument are built on EU-800 Series cards and thus can be used in the 801A, 51A and 53A "Stack-n-Patch" for design and study.

Pick A Card . . . Any Card . . . Heath now offers close to two dozen individual circuit cards to further expand the capability of the 800 Series System or any part of it. Dual & Quad J-K Flip-Flops, And-Or-Invert, Nand Gate, Dual Monostable, Op Amp, Gate Control, DCU . . . even a Dual Inline IC socket card and a blank circuit card ready to etch—just pick the ones that meet your needs and plug into the 801A, 805A, 51A or 53A. More cards are coming.

Discover A Totally New Technique For Design, Experimenting And Teaching . . . the Heath 800 Series System.

THE TEXTBOOK—Digital Electronics for Scientists.

Authors:

H. V. Malmstadt, Professor, University of Illinois.

C. G. Enke, Associate Professor, Michigan State University.

Publisher: W. A. Benjamin, Inc., New York 1969

525 pages, 396 figures, 106 experiments.

EUP-19 \$9.50

EU-801A, Analog Digital Designer \$435.00

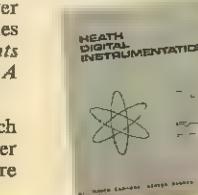
EU-51A, Experimental Parts Group \$135.00

EU-53A, "Stack-in-Patch" \$37.50

EU-805A, Universal Digital Instrument \$1250.00

EU-805D, Universal Digital Instrument, less DVM \$940.00

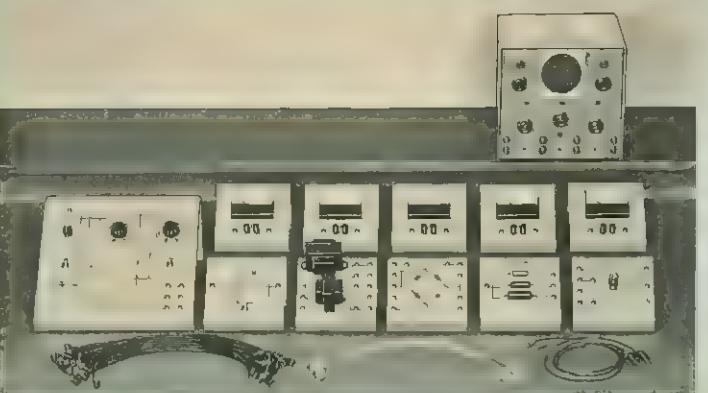
For specifications on these and other items in the EU-800 Series Modular Digital System, write for your free copy of the new Heath Scientific Instrumentation Catalog.



Send for this abridged Manual on the
Heath/Malmstadt-Enke Modular Digital System

Principles, operation and applications of modules and cards of the Analog Digital Designer and of the Universal Digital Instrument are described with full details, specifications and schematics. Available for \$3.50. (Order model EUA-800A.)

Heath Teaching Systems



IDS-100
Complete System \$395.00

IDW-39
(Less EUW-25
Oscilloscope) \$220.00

IDW-39 SPECIFICATIONS—SIMULATOR CONSISTS OF: (1) Control Module, (1) Inverse Reducer Module, (1) Transformer Module, (1) Rectifier Module, (1) Capacitor Module, (1) Tube Module, (5) Meter Modules as follows: (1) 0-150 VAC Rectifier Type Voltmeter, (1) 0-300 VAC Rectifier Type Voltmeter, (1) 0-250 VDC Voltmeter, (1) 0-2 AMP. AC Ammeter, (1) 0-50 mA. DC Milliammeter. **Accuracy:** Meters are $\pm 2\%$ for full scale except AC Voltmeters which are $\pm 3\%$ of full scale. **Sensitivity:** All voltage meters are 1000 ohms per volt. AC Ammeter resistance is 0.115 ohm. DC Milliammeter resistance is approximately 1.0 ohm. **Tube:** Type No. 5722 (Sylvania). **Controls:** Filament control (located on control panel) provides variation of the current in the tungsten filament of the tube. **K.V. Control:** (actual simulator voltage 300 rms. max.) provides voltage control in the primary circuit of the high voltage transformer which in turn determines high voltage (300 volts rms maximum) appearing across the simulator tube. **Dimensions:** All modules measure 6" W. x 4" H. x 5-7/16" D. except for Control Module, which measures 12" W. x 6-1/4" H. x 11-1/4" D. **Power requirements:** 105-125 VAC 50-60 Hz. Approximately 35 watts max. **IDS-100 SYSTEM SPECIFICATIONS:** Same as IDW-39 above plus EUW-25 DC Oscilloscope. **EUW-25 SPECIFICATIONS:** (Vertical and horizontal channels identical): Bandwidth: DC to 400 kHz (3 dB point). Sensitivity: 0.1 V. (peak-to-peak) per 1/4". Attenuator: 3-position, compensated type. Gain Control: Continuously variable. Input impedance: 3.6 megohms shunted by 35 mmf. Coupling: Either AC or DC, switch-selected. Relative phase shift between channels: Less than 5°. Sweep generator (recurrent type): Linear saw-tooth produced by multivibrator type generator covering 5 Hz to 50 kHz in four over-lapping ranges. External capacity binding post for lower sweep rates. Sync. Provision: Either internal or external, switch-selected. Power requirements: 105-125 V 50-60 Hz AC at 100 watts max. Dimensions: 9-1/2" H. x 9-3/16" W. x 11-9/16" D.

New Heath X-Ray Machine Simulator . . .

The Safe, Low Cost Way To Teach X-Ray Machine Operation

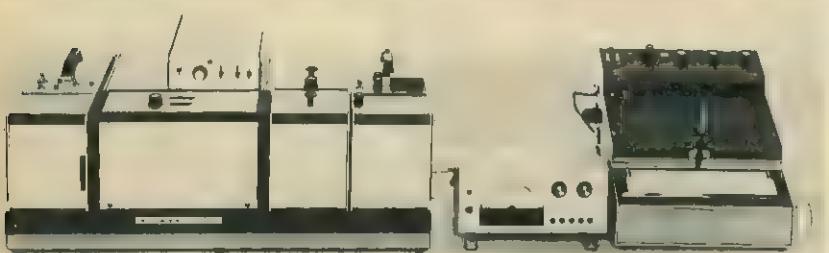
The New Heath X-Ray Machine Simulator is based on a system originally developed by Dr. E. Dale Trout, noted radiologist at Oregon State University, under contract to the U.S. Dept. of Health, Education & Welfare, and further refined by Heath into a low cost, versatile system for teaching basic X-ray machine operation. Designed for use in the radiological technology classroom, the factory assembled and tested IDW-39 simulates the electrical operating characteristics of the three basic types of X-ray machines (self-rectified, half-wave rectified & full-wave rectified) . . . frees actual X-ray machines for their intended purpose and eliminates the cost, size & hazard problems of using actual X-ray equipment for teaching.

The Simulator . . . composed of six basic modules which electrically simulate the control functions, transformer section, X-ray tube section, basic rectification methods, different lengths of high voltage cable and self-rectified high voltage characteristics of an actual X-ray machine installation. Five Metering Modules are also included to measure the different voltages and currents present, and to visibly indicate to the student the effect of control setting changes throughout the system. All modules have their working surfaces at fixed angles for convenience, and external jacks on the front panels make interconnection easy. All connecting cables are supplied.

Complete Course Materials Supplied. The price of the basic Simulator includes two instructors' manuals and ten student manuals (extra student manuals are available at low cost). The student manuals are designed to give actual classroom experience in the basic operating techniques of X-ray machines, and include lab exercises in Self-Rectified, Half-Wave Rectified, Full-Wave Rectified and No-Load Transformer Ratio problems. A full set of Laboratory Data Sheets, blank graph paper and a thorough discussion section is also included in the manual.

The IDS-100 System includes the IDW-39 Modules, connecting cables and manuals mentioned above, plus the Heath/Malmstadt-Enke EUW-25 DC Oscilloscope, which enables instructors to introduce new information into the course in the form of visual readout and the varying effects of different voltage and current parameters. See your Heathkit catalog or Heath Scientific Instrumentation catalog for additional information on the EUW-25 Oscilloscope. If you are involved in the teaching or supervision of an X-ray Technology Course, the new Heath X-ray Simulator can provide safe facilities and save valuable time and money. Order now, or write for the complete system brochure at no cost.

IDW-39, X-Ray Machine Simulator (less oscilloscope) 23 lbs.... \$220.00
IDS-100, X-Ray Machine Simulator (incl. oscilloscope) 41 lbs.... \$395.00



Heath/Malmstadt-Enke Modular Spectroscopy Systems

Heath Spectroscopy Systems are a departure from classical spectrophotometer design, in that they are combinations of discrete modules, locked together into single unitized instruments. This modular concept enables schools, research facilities and labs all over the world to enjoy precision spectroscopy capability at remarkably low cost . . . and conversion to another system is merely a matter of substituting the appropriate module, sliding it onto the instrument base and locking it into the system with perfect optical alignment—in less than ten minutes.

Systems Available Now are the EU-701 (Single Beam UV-VIS) and the EU-703 (Atomic Absorption/Atomic Emission/Atomic Fluorescence). A Double Beam system will be available soon. All Heath systems feature digital stepped scanning in 9 fixed rates to 20 angstroms/sec . . . less than 0.1% stray light . . . precision Czerny-Turner optics . . . choice of readout—analog meter, chart recorder, digital or all three. For complete information on this low cost way to put complete precision spectrophotometry facilities in your lab, send for your free Heath Scientific Instrumentation catalog.

EU-701A, complete system less readout . . . \$2245.00
EU-703-A, complete system less readout . . . \$2736.00

Write On Your School or Company Letterhead For Your FREE Copy Of The Latest Heath Scientific Instrumentation Catalog

Among the many research-quality instruments in the new Heath Instrumentation catalog are the Heath 700-Series Modular Spectrophotometers . . . Digital-Analog Systems . . . Heath components for the Berkeley Physics Lab . . . the new EU-51A Experimental Parts Group for electronic design and teaching applications . . . the complete line of Heath/Malmstadt-Enke Laboratory Equipment . . . plus the famous Heathkit Test Equipment. Whatever your lab or instrumentation needs, check this new Heath Instrumentation catalog first . . . for greater versatility, reliability and value. Send for your FREE copy now.



Open Your Heath Account—No Money Down Up To \$300—Up To 18 Months To Pay—See Order Blank For Details

Announcing The New Heathkit® SB-220 Linear Amplifier...

2 KW PEP SSB . . .

1 KW CW And RTTY . . .

80 Through 10 Meters . . .

Built-In Power Supply . . .

Only \$349.95



Kit SB-220
\$349.95

The New Heathkit SB-220 Is Here . . . With A Price And Performance That Make It Well Worth The Wait!

• A complete 2 KW rig in a compact desk top unit • Uses a pair of Eimac 3-500Z's in the grounded grid final to provide up to 2000 watts PEP input on SSB . . . and is one of the very few finals available that can be loaded to 1000 watts input on CW and RTTY. The broadband pretuned pi input circuit delivers high efficiency with low distortion . . . and the new "220" can be used with most excitors since it requires only 100 watts of drive for full output.

Built-In Solid-State Supply . . . can be wired for either 120 or 240 VAC—and changed to the other in minutes should your power requirements change. Circuit breaker protection eliminates keeping fuses on hand. Zener diode regulated operating bias reduces idling current to a bare minimum for longer tube life and cooler running, and the large quiet fan coupled with an open layout permits the SB-220 to run cooler than most excitors.

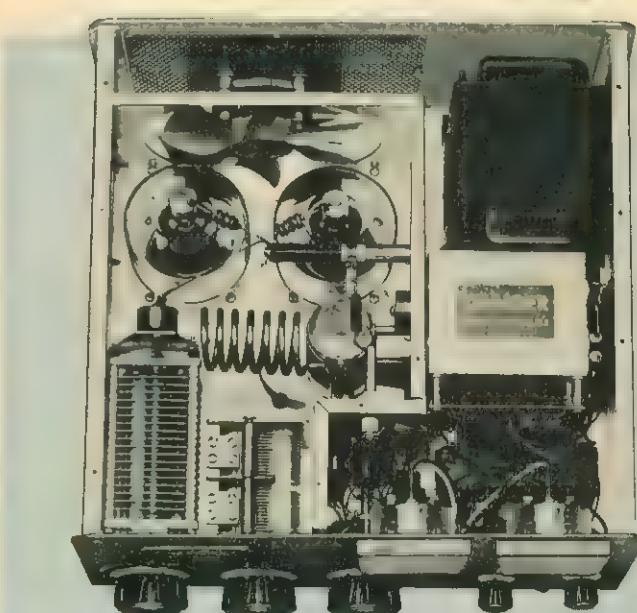
Double Shielded. The new Heathkit "220" is the only linear amplifier on the market with double shielding for really maximum TVI protection.

Fast, Easy Tune-Up . . . set the band switch, push the CW-Tune/SSB rocker switch to the CW-Tune position and adjust the Load & Tune controls for maximum relative power. Push the rocker switch to the SSB position and you're ready to go with 2 kW PEP input . . . push it back to CW and you've got a full gallon on CW or RTTY.

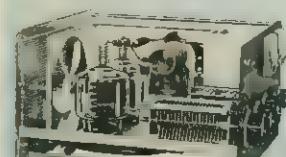
Other Features include ALC to prevent overdriving, complete front panel monitoring facilities, easy 20 hour assembly and the sharp styling common to all the famous members of the Heathkit SB-Series.

Tired Of Stumbling Barefoot Through The QRM? Put some big shoes on . . . the Heathkit SB-220—the big new hot one from the Hams at Heath!

Kit SB-220, 55 lbs . . . \$349.95



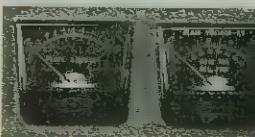
Inside The New Heathkit SB-220 . . . a clean yet compact design. Note the liberal use of internal shielding for extra strength and isolation of components. The power supply components are on the right, metering and bandswitching circuitry at lower right and the final compartment is at left.



Power To Spare. Two rugged, dependable Eimac 3-500Z's in the final give your signal the sound of authority. Note the large fan behind the finals . . . the SB-220 actually runs cooler than most excitors.



Giant Power Supply. It takes a husky, well regulated supply to meet the demands of high power operation . . . and the SB-220 has one. Note the massive plate transformer on the right and the large filament & bias transformer on the left. The 25 ufd capacitor bank in the center delivers excellent dynamic regulation.



Complete Metering Facilities. You're never in doubt about the important operating characteristics of this final . . . the left meter gives continuous monitoring of plate current, and the one on the right can be switched to read grid current, relative power and plate high voltage.

All Items On These Two Pages Shipped REA Or Motor Freight

Heathkit® SB-Series Gear...The Hot Ones



Heathkit SB-101 . . .
The World's Most Popular SSB Transceiver

• 180 watts input P.E.P. SSB—170 watts input CW on five bands, 80-10 meters
• Switch selection of Upper or Lower sideband or CW filters • Built-in CW sidetone • Operates PTT or VOX • Transceiver tuning with Heath SB-Series LMO (Linear Master Oscillator; features 1 kHz dial calibration) or crystal-control transmit with VFO receive or crystal-control transceive • Separate offset CW carrier crystal • Triple Action Level Control • Built-in 100 kHz crystal calibrator • Quiet, enclosed relays • Fixed or mobile operation with appropriate power supply • Fast assembly with circuit boards and wiring harnesses • "Unlocked" transmitter frequency control with SB-640 External LMO • Simple alignment—requires only a VTVM, or VOM, a dummy load and a broadcast receiver

Order The SB-101 For The Best Value In SSB Transceivers . . . The SB-101 features the famous Heath pre-built LMO (Linear Master Oscillator) for superior tuning characteristics, USB/LSB selection, TALC, built-in VOX and calibrator, low cost power supplies, plus all the other proven features and performance already established by the SB-100.

Put Your SB-Series Rig On "2"

For Only \$179.95 With The New SB-500

• Provides complete 2-meter transceive capability for SB-101, SB-110A, HW-100 and the SB-301/401 combination • 144 to 148 MHz coverage • 130 watts PEP input . . . 50 watts PEP output • Highly sensitive receiver • Fast, easy tuning • Built-in meter monitors plate current and relative power • Built-in power supply • Built-in 1 MHz crystal calibrator • No cable switching • Hand some SB-Series styling

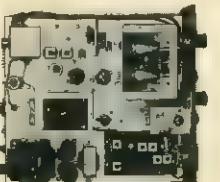
Now, in answer to many requests, Heath has a fast, low cost way to put you on 2-meters . . . without having to buy a whole new rig. If you own an SB-101, SB-110A, HW-100 or the SB-301/401 combination, you're almost there. Here are the details on how to get on "2" . . . the Heathkit SB-500 way.

Here's How It Works. On Receive, the "500" takes an incoming 2-meter signal and heterodynes it to either 6 or 10 meters, where the low band gear handles it in the usual way. On Transmit, a 28 or 50 MHz driver output is heterodyned to 2-meters, amplified and coupled to the output.

Here's What It Delivers. When used with any of the gear above, the "500" gives you complete SSB or CW transceiver operation from 144 to 148 MHz. Two low cost 6146's in the final deliver a husky 50 watts output into a 50 ohm non-reactive load. The driving unit supplies final plate voltages, but all other operating voltages come from a built-in power supply. Receiver sensitivity is 0.2 uV for solid copy QSO's. A front panel on-off switch puts the "500" into operation or allows the low band gear to operate straight through or drive a linear . . . a combination of rear apron jacks and internal relay switching eliminates cable changing completely. Tuning is quick and easy, and a built-in meter monitors final plate current or relative power. ALC voltage is supplied to the driver to aid in preventing overdriving. Reliable relay-controlled T/R switching and a built-in 1 MHz calibrator are also included.

Rugged, Stable Construction. The sensitive receiver and oscillator go together on well-planned circuit boards. To insure stability and make adjustment exact, the transmitter and power supply components are chassis mounted. The "500" comes complete with all connecting cables too. Start enjoying the QRM-free world of 2-meters now . . . with the new Heathkit SB-500.

Kit SB-500, 19 lbs. \$179.95



Inside The SB-500. Well-engineered from any standpoint, the "500" is a solid, reliable piece of gear. Note that the final, oscillator and relays are all completely shielded for maximum TVI protection. The power supply is lower left, receiver circuit board lower right, driver and final upper right. Overall layout is clean and open, for easy adjustment and service.

Open Your Heath Account—No Money Down Up To \$300—Up To 18 Months To Pay—See Order Blank For Details

From The Hams At Heath



A Heathkit SB-301 Amateur Band Receiver

• Increased sensitivity • RTTY position on mode switch • 80-10 meter coverage with 15 to 15.3 MHz for WWV • Panel switch position for 6 & 2 meter converters • Built-in, switch-selected ANL • Truly linear tuning by Heath LMO • Less than 100 Hz per hour drift after 20 min. warm-up • 1 kHz dial calibrations • Built-in 100 kHz crystal calibrator • Operates transceive with SB-401 • Built-in power supply

Features Full RTTY Reception, 80 thru 2 meter coverage with optional converters, ANL, WWV reception and more. Write for complete specifications.

Kit SB-301, less speaker, 25 lbs. \$270.00

SBA-301-1 Optional AM crystal filter (3.75 kHz), 1 lb. \$20.95

SBA-301-2 Optional CW crystal filter (400 Hz), 1 lb. \$21.95

SBA-300-3 (6 meter), 2 lbs. \$19.95

SBA-300-4 (2 meter), 2 lbs. \$19.95

SB-301 PARTIAL SPECIFICATIONS—Frequency range (megahertz): 3.5 to 4.0, 7.0 to 7.5, 14.0 to 14.5, 15.0 to 15.5, 21.0 to 21.5, 28.0 to 29.0, 29.5 to 30. Intermediate frequency: 3.395 megahertz. Frequency stability: Less than 100 Hz per hour after 20 min. warmup under normal ambient conditions. Less than 100 Hz for $\pm 10\%$ line voltage variation. Visual dial accuracy: Within 200 Hz on all bands. Electrical dial accuracy: Within 400 Hz on all bands after calibration at nearest 100 kHz point. Backlash: No more than 50 Hz. Sensitivity: Less than 0.3 microvolt for 10 dB signal-plus-noise to noise ratio for SSB operation. Modes of operation: Switch selected; LSB, USB, CW, AM, RTTY. Selectivity: RTTY: 2.1 kHz at 6 dB down, 5.0 kHz at 60 dB down (crystal filter supplied). SSB, 2.1 kHz at 6 dB down, 5.0 kHz at 60 dB down (crystal filter supplied). AM: 3.75 kHz at 6 dB down, 10 kHz at 60 dB down (crystal filter available as accessory). CW: 400 Hz at 6 down, 2.0 kHz at 60 dB down (crystal filter available as accessory). Spurious response: Image and IF rejection better than 50 dB. Internal spurious signals below equivalent antenna input of 1 microvolt. Audio response: SSB, 350 to 2450 Hz nominal at 6 dB. AM: 200 to 3500 Hz nominal at 6 dB. CW: 800 to 1200 Hz nominal at 6 dB. Audio output impedance: Unbalanced nominal 8 ohm speaker and high impedance headphone. Audio output power: $\frac{1}{2}$ watt with less than 8% distortion. Antenna input impedance: 50 ohms nominal. Muting: Open external ground at Mute socket. Crystal calibrator: 100 kHz crystal. Power supply: Transformer operated with silicon diode rectifiers. Power requirements: 120/240 V AC, 50/60 Hz, 50 watts. Dimensions: 14 $\frac{1}{2}$ " W x 6 $\frac{1}{2}$ " H x 13 $\frac{1}{2}$ " D.

B Matching Heathkit SB-200

Kilowatt Desk-Top Linear Amplifier

• 1200 watts P.E.P. input SSB—1000 watts CW • 80 through 10 meter band coverage • Built-in SWR meter—Antenna relay—Solid-state power supply • Automatic Level Control (ALC) • Shielded, fan-cooled amplifier compartment • Pre-tuned cathode input circuit for maximum efficiency & low distortion • Circuit-breaker power supply protection—no fuses • Designed for 120/240 volt operation

Provides up to 1200 watts P.E.P. Input SSB and 1000 watts CW. Requires only 100 watts driving power. Built-in solid-state power supply.

Kit SB-200, 41 lbs. \$220.00

SB-200 SPECIFICATIONS—Band coverage: 80, 40, 20, 15 & 10 meters. Maximum power input: 1200 watts P.E.P. SSB, 1000 watts CW. Driving power required: 100 watts. Duty cycle: SSB, continuous voice modulation; CW, 50% (key down time not to exceed 5 min.). Third order distortion: 30 dB or better at 1000 watts P.E.P. Output impedance: 50 to 75 ohm unbalanced; variable pi-output circuit. SWR not to exceed 2:1. Input impedance: 52 ohm unbalanced; broad-band pretuned input circuit requires no tuning. Meter functions: 0-100 ma grid current, 0-1000 ma plate current, 0-1000 relative power, 1:1 to 3:1 SWR, 1500 to 3000 volts high voltage. Front panel controls: Load, Tune, Band; Relative Power Sensitivity; Meter Switch, Grid-Plate-Rel. Power-SWR-HV; and Power Switch, on/off. Tube complement: Two 572B/T-160-L (in parallel). Power requirements: 120 volts AC @ 16 amperes (max.), 240 volts AC @ 8 amperes (max.). Cabinet size: 14 $\frac{1}{2}$ " W x 6 $\frac{1}{2}$ " H x 13 $\frac{1}{2}$ " D. Net weight: 35 lbs.

C Matching Heathkit SB-401 SSB Amateur Transmitter

• 5-band 80-10 meter coverage • Single panel switch selects transceive or independent operation of SB-401 and SB-301 (or SB-300) combination—no cable changing required • Can be operated as an independent transmitter with any other make of receiver when SBA-401-1 crystal group (not required with SB-300 or SB-301) is installed • Built-in power supply • LMO (Heath Linear Master Oscillator) frequency control

Operates USB/LSB & CW and features 1 kHz dial calibration with true



SB-110A (less mike) (less speaker) \$299.00

• Features the Heath SB-Series LMO (Linear Master Oscillator) for high stability, linear tuning, and 1 kHz dial calibration • Full SSB-CW transceive operation on six meters • 180 watts input PEP SSB—150 watts CW • Switch select for Upper Sideband/Lower Sideband/CW operation • Separate offset CW carrier crystal for clear, pure, CW note • ALC & ANL • Built-in 100 kHz calibrator & antenna switching • Covers 50-52 MHz with crystals supplied • total coverage 49.5-54 MHz • Crystal filter SSB generator • Fixed station or mobile operation with the Heathkit HP-23A or HP-13A power supplies

Heathkit SB-110A 6-Meter Transceiver

Kit SB-110A, 23 lbs. \$299.00

Kit SBA-100-1, Mobile Mounting Kit, 6 lbs. \$14.95

Kit HP-13A, DC Supply, 7 lbs. \$69.95

Kit HP-23A, AC Supply, 19 lbs. \$51.95

PARTIAL SB-110A SPECIFICATIONS—RECEIVER SECTION: Sensitivity: 0.1 uV for 10 dB signal-plus-noise to noise ratio. Selectivity: 2.1 kHz at 6 dB down, 5 kHz max. @ 60 dB down. Image rejection: 50 dB or better. IF rejection: 50 dB or better. Audio output power: 1 watt. AGC characteristics: Audio output power varies less than 12 dB for 50 dB change of input signal level (0.5 uV to 150 uV). TRANSMITTER SECTION: DC power input: SSB, 180 watts PEP; CW, 150 watts. RF power output: SSB, 100 watts PEP. CW, 90 watts (50 ohm non-reactive load). Output impedance: 50 ohm nominal with not more than 2:1 SWR. Carrier suppression: 55 dB down from rated output. Unwanted sideband suppression: 55 dB down from rated output @ 1000 Hz & higher. Distortion products: 30 dB down from rated PEP output. Hum & noise: 40 dB or better below rated carrier. Keying characteristics: VOX operated from keyed tone using grid-block keying. GENERAL: Frequency coverage: 49.5 to 54.0 MHz in 500 kHz segments (50.0 to 52.0 MHz with crystals supplied). Frequency selection: Built-in LMO or crystal control. Frequency stability: Less than 700 Hz drift per hour after 20 minutes warmup under normal ambient conditions. Less than 100 Hz drift for $\pm 10\%$ supply voltage variations. Dial Accuracy: Electrical, within 400 Hz on all band segments, after calibration at nearest 100 kHz point. Visual, within 200 Hz. Dial backlash: No more than 50 Hz. Calibration: Every 100 kHz. Power requirements: High voltage, +700 v. DC @ 250 ma. with 1% max. ripple. Low voltage, +250 v. DC @ 100 ma with .05% max. ripple. Bias voltage, -115v. DC @ 10 ma with .5% max. ripple. Filament voltage, 12.6 v. AC/DC @ 4.355 amps. Dimensions: 14 $\frac{1}{2}$ " W x 6 $\frac{1}{2}$ " H x 13 $\frac{1}{2}$ " D.



HW-100
\$250.00

Low Cost...High Performance...

The Heathkit HW-100 5-Band SSB-CW Transceiver . . . Red Hot Performance At A Money-Saving Kit Price

• Solid-state (FET) VFO • 80-10 meter coverage • Switch selected upper or lower sideband or CW • 180 watts input PEP SSB-170 watts input CW • Crystal filter • Full coverage on all bands with 500 kHz per band segment • Smooth vernier control of frequency with patented Harmonic Drive™ dial mechanism • Built-in 100 kHz calibrator • Separate offset CW carrier crystal • TALC • Quiet, enclosed relays • Fixed or mobile operation with HP-23A or HP-13A power supplies • Easy assembly with circuit boards and wiring harness

The World's Fastest Selling Transceiver . . . and the reasons are clear. The HW-100 is easy to build, a pleasure to use, and most important, it delivers what every ham wants—a solid signal coupled with a hot receiver . . . at lowest possible cost. Here's the hot one close up.

The Receiver boasts a sensitivity of 0.5 uV for 10 dB S+N/N ratio for SSB operation. Crystal filter selectivity is 2.1 kHz @ 6 dB down, 7 kHz @ 60 dB. Image & IF rejection are both better than 50 dB.

The Transmitter delivers 180 watts PEP SSB input, 170 watts CW input. Carrier and unwanted sideband suppression is 45 dB down; 3rd order distortion 30 dB down; RF compression (TALC) is 10 dB or better. Outstanding stability . . . less than 100 Hz/hour drift after 30 minute warmup . . . less than 100 Hz variation under a 10% line voltage change. The HW-100 operates PTT or VOX on either sideband, and semi-break-in transceive by operating VOX from a keyed tone, using grid-block keying. CW Side-tone: Internally switched to speaker or headphones; in CW mode. Approximately 1000 Hz tone. Microphone input: VOX from a keyed tone, using grid-block keying. The 1 kHz CW sidetone is internally switched to either speaker or headphones.

A Pleasure To Use . . . the patented Harmonic Drive™ provides 28 knob revolutions per 500 kHz band segment with 5 kHz divisions. Front panel controls include Band & Mode Selectors, Load, Final Tune, Driver Pre-selector, Mic/CW Level, Mic Connector & Phone Jack. Switches for metering functions and PTT/VOX/CAL are adjacent. Put the world's best value in sideband in your shack now . . . the HW-100—another hot one from the Hams at Heath.

Kit HW-100, 22 lbs.....\$250.00
Kit SB-600, 8 ohm speaker, 6 lbs.....\$19.95
Kit HP-13A, DC power supply, 7 lbs.....\$69.95
Kit HP-23A, AC power supply, 19 lbs.....\$51.95

*Triple Action Level Control™

HW-100 SPECIFICATIONS—RECEIVER: Sensitivity: Less than .5 microvolt for 10 dB signal-plus-noise ratio for SSB operation. Selectivity: 2.1 kHz minimum of 6 dB down 7 kHz maximum at 60 dB down (3.395 MHz filter). Input Low impedance for unbalanced coaxial input. Output impedance: 8 ohm speaker, and high impedance headphones. Power output: 2 watts with less than 10% distortion. Spurious response: Image and IF rejection better than 50 dB. **TRANSMITTER:** DC Power input: SSB: [A3] emission 180 watt P.E.P. (normal voice: continuous duty cycle). CW: [A1 emission] 170 watts (50% duty cycle). RF Power output: 100 watts on 30 through 15 meters; 80 watts on 10 meters (50 ohm non-reactive load). Output impedance: 50 ohm to 75 ohm with less than 2:1 SWR. Oscillator feed-through or mixer products: 55 dB below rated output. Harmonic radiation: 45 dB below rated output. **Transmit-receive operation:** SSB: PTT or VOX. CW: Provided by operating VOX from a keyed tone, using grid-block keying. **CW Side-tone:** Internally switched to speaker or headphones; in CW mode. Approximately 1000 Hz tone. Microphone input: VOX from a keyed tone, using grid-block keying. The 1 kHz CW sidetone is internally switched to either speaker or headphones.

A Pleasure To Use . . . the patented Harmonic Drive™ provides 28 knob revolutions per 500 kHz band segment with 5 kHz divisions. Front panel controls include Band & Mode Selectors, Load, Final Tune, Driver Pre-selector, Mic/CW Level, Mic Connector & Phone Jack. Switches for metering functions and PTT/VOX/CAL are adjacent. Put the world's best value in sideband in your shack now . . . the HW-100—another hot one from the Hams at Heath.

Kit HW-100, 22 lbs.....\$250.00
Kit SB-600, 8 ohm speaker, 6 lbs.....\$19.95
Kit HP-13A, DC power supply, 7 lbs.....\$69.95
Kit HP-23A, AC power supply, 19 lbs.....\$51.95

Heathkit Solid-State Mobile Power Supply for SSB Rigs

Kit HP-13A, DC Supply, 7 lbs.....\$69.95

HP-13A SPECIFICATIONS—Input voltage: 12 to 16 volts DC (for negative ground only). **Input current:** 25 amperes maximum with full load. **High voltage output:** 800 volts DC, no load; 750 volts DC @ 250 mA. **AC ripple:** Less than 1% @ 250 mA. **Duty cycle:** Continuous up to 150 mA; 50% up to 300 mA. **Low voltage output:** (high tap) 310 volts DC, no load; 300 volts DC @ 150 mA. (low tap) 265 volts DC, no load; 250 volts DC @ 150 mA. **AC ripple:** Less than .05% @ 150 mA. **Continuous duty cycle to 175 mA.** Adjustable bias voltage: —40 to —180 volts DC @ 20 mA max. Duty cycle: Continuous. Switching frequency: 1500 Hz (approx.). **Ambient temperature:** —10° to 122° F. **Dimensions:** 7 1/2" W x 7-5/16" L x 2 1/2" D. All voltages referenced at 13 VDC input.



HW-12A
\$99.95



HW-22A
\$104.95
HW-32A
\$104.95



Heathkit Single-Band SSB Transceivers Look Better, Work Better, Cost Less

• Now Upper Or Lower sideband operation on all Single Banders • Choose 80, 40, or 20 meter model • Improved styling • More convenient control locations • 200 watts P.E.P. input • Single knob tuning with 2 kHz dial calibration • New ALC input for use with external linear amplifiers • Excellent excitors for operation on the band of your choice with the SB-200 Linear Amplifier • Now with improved audio and AVC response • Crystal filter type SSB generation • Built-in S-meter, VOX, PTT, and ALC • Easy to build—circuit board and wiring harness

The New Single-Banders Bring You Even Greater Economy . . . Better Performance. Microphone input and gain control are now located on the front panel as is the bias adjustment for ease in changing from fixed to mobile operation. An added function switch position controls the optional HRA-10-1 crystal calibrator. A new 11 pin power plug is compatible with SB series power supply connections. Smart new "SB-Series" look.

The Performance You Expect Only In High-Priced Equipment. The receiver is a 14 tube superheterodyne with 1 uv sensitivity, 2.7 kHz selectivity and fast attack-slow release AVC action for optimum SSB reception. Heathkit experience in transceiver tuning circuitry has provided the Single-Banders with a stable, smooth-tuning, temperature-compensated VFO. The quality

crystal lattice filter produces clean transmitted signals with unwanted sideband and carrier at least 45 db down.

Kit HW-12A, 80-meter, 15 lbs.....\$99.95
Kit HW-22A, 40-meter, 15 lbs.....\$104.95
Kit HW-32A, 20-meter, 15 lbs.....\$104.95
GH-12A, Push-to-talk and VOX microphone, 1 lb.....\$8.95
Kit HRA-10-1, Plug in 100 kHz crystal calibrator, 1 lb.....\$9.95
Kit HP-13A, DC Power Supply, 7 lbs.....\$69.95
Kit HP-23A, AC Power Supply, 18 lbs.....\$51.95
Kit HS-24, Mobile Speaker, 4 lbs.....\$7.95

SPECIFICATIONS—RF input: 200 watts PEP. **Sideband generation:** Crystal lattice bandpass filter method. **Stability:** 200 Hz per hour after warm-up. **Carrier & unwanted sideband suppression:** 45 dB. **Frequency coverage:** HW-12A: 3.8—4.0 MHz; HW-22A: 7.2—7.3 MHz; HW-32A: 14.2—14.35 MHz. **Receiver sensitivity:** 1 uv for 15 dB (S+N)/N ratio. **Operation:** LSB, USB. **Audio output:** 1 watt @ 8 ohms. **Mike input:** Hi-Z. **Tube complement:** Fourteen tube heterodyne circuit; (3) 6EA8's, mic. amp., VOX relay amp., IF amp., RF amp., Recvr. mixer; (5) 6AU6's, VFO, VOX amp., IF amps., Xmt. mixer; (1) 6BE6; RF isolator (HW-12A); Met. osc. and mixer (HW-22A & HW-32A); (1) 12BY7 Driver; (1) 12AT2 Xtal. osc., product det.; (1) 6E8B Audio amp. and output; (2) 6GE5 RF output. **Power requirements:** 800 VDC @ 250 mA peak, 250 VDC @ 100 mA, —130 VDC @ 5 mA, 12 VAC or VDC @ 3.75 amperes. **Cabinet dimensions:** 6 1/4" H x 12 1/4" W x 10" D.

Open Your Heath Account—No Money Down Up To \$300—Up To 18 Months To Pay—See Order Blank For Details

Heathkit® HW-Series Gear

HW-17A Solid-State 2-Meter AM Transceiver . . . Now With Optional FM Adapter Kit

• Frequency Range 143.2 to 148.2 MHz • Solid-state, dual conversion superheterodyne receiver • Pre-built, pre-aligned FET tuner • Spot function for finding transmit frequency on receiver dial • Hybrid transistor-tube type transmitter design • 8 to 10 watts power output • 4 crystal sockets plus provision for external VFO such as Heathkit HG-10B (page 48) • Built-in 120-240 VAC power supply • Optional DC mobile supply (see below) • PTT operation, electronically switched • Front panel meter for signal strength and relative power output • Built-in automatic noise limiter and squelch • Lighted dial • Built-in speaker • Battery saver feature for low current drain during mobile monitoring • Gimbal mount included for mobile use • Ceramic PTT microphone included • 15 transistors, 20 diodes, 3 tubes, 2 circuit boards • Builds in about 20 hours

A Compact, Versatile Package . . . really a separate receiver & transmitter on one chassis (the only common circuitry are the power supply and the audio output/modulator). The solid-state dual conversion superhet receiver has 1 uv sensitivity, 100 kHz dial calibration, ANL and squelch. Selectivity of 27 kHz at 6 dB down makes for easy tuning and the front panel meter indicates received signal strength & relative power output. The front panel, 3-position switch has a "Spot" position, Receive/Transmit position and a Battery-Saver position that's ideal for mobile monitoring (draws only 100 mA). A 3x5" speaker is built in. The transmitter has a 25-30 watt input and an AM output of 8-10 watts. Modulation is automatically limited to less than 100%. Choose any of 4 front panel selected crystal frequencies or use an external VFO (the HG-10B is perfect, see p. 48). Includes a PTT mike & mobile mount. When you go 2-meter phone, go HW-17A. And check out the HWA-17-1 Solid-State mobile power supply too.

Kit HW-17A, 2M Transceiver, 18 lbs.....\$129.95
Kit HWA-17-1, Transistorized DC supply, 4 lbs.....\$24.95



HW-17A
\$129.95

HW-17A SPECIFICATIONS—RECEIVER: Frequency coverage: 143.2-148.2 MHz. Dial calibration: 100 kHz. **IF Frequencies:** Double conversion: 1st IF: 24.965 MHz; 2nd IF: 2 MHz. **Sensitivity:** 1 uv input for 10 db S/N + N. Selectivity: 27 kHz @ 6 dB down. **Input impedance:** 50-72 ohm, unbalanced. **Audio output:** 1 watt @ less than 10% distortion. **Headphone Jack:** Low impedance, accepts PL-55 type plug (standard 2-conductor 1/4" sleeve). **Transistor complement:** (2) 2N4416 RF Amplifier, 1st Mixer; SE5023 HF variable oscillator; (4) 2N3694 2nd Mixer; crystal oscillator, 1st IF amplifier, 2nd IF amplifier; (1) 2N3391 Audio Preamp; (1) 2N3392 Squelch amplifier; (1) X29A829 Squelch Gate; 2N1274 Audio Driver; (2) 40050 Audio/Modulator output. **TRANSMITTER:** Frequency coverage: 143.2-148.2 MHz. **RF Power input:** 25-30 watts. **RF Power output:** 8-10 watts. **Mode:** Type A3 (AM). **Modulation:** Automatically limited to 100% or less. **Output impedance:** 50-72 ohm, unbalanced. **Crystal sockets:** Accepts FT-243 type holders, pin diameter .093", pin spacing .466", and HC6/U type in diameter .050", pin spacing .466". **Transistor/tube complement:** 7050 Oscillator/Amplifier-Tripler-Tripler; 12GN7 Doubler/Driver; 8156 Power Amplifier; (2) 2N3391 Microphone Preamp, Microphone Driver. **Temperature range:** —20° to +50° C. **Power requirements:** 120 or 240 VAC input. Receiver Trans.—20 watts; Batt. Saver—8 watts; Spot—35 watts; Transmitter—100 watts. **Cabinet dimensions:** 14 1/4" W x 8 1/2" D x 6 1/2" H including microphone & mounting feet. **Net weight:** 13 lbs.

HWA-17-1 SPECIFICATIONS—Input voltage: 12 to 15 volts DC (Note: a 13.5 volt DC input was used in determining the electrical specifications). For negative ground systems only. Input current: 10 amperes maximum. Allowable ambient temperature: 10 degrees F. to 122 degrees F. High voltage output: 380 VDC no load, 340 VDC at 150 mA load. Ripple: 1% of 150 mA. Duty cycle: 50%. Conversion frequency: 2500 Hz (approx.). Dimensions: 3 3/4" W x 7-5/16" L x 2 1/2" H. Net weight: 3 lbs.

national calling & working frequency of 146.94 MHz is included. Get on 2-Meter FM now . . . the low cost HWA-17-2 way.

Kit HWA-17-2, 2 lbs.....\$17.95

HWA-17-2 SPECIFICATIONS—Band Coverage: 144-148 MHz (crystal controlled). Input Load Impedance: 50 k ohms or greater. Output Voltage: 7 volts RMS, open circuit. Crystal Frequency: 8.000 to 8.222 MHz. Deviation: Adjustable. Tube Complement: (1) 12BA6 Crystal Oscillator; (1) 12AT7 Phase Modulator and Buffer. Power Required: (furnished by HW-17 series) 12.6 VAC @ 300mA; 300 VDC @ 25mA.

A Unique Low Cost Crystal-Controlled SSB Transceiver Especially Designed For Use by CAP



Assembled HWW-18-1, ready to operate CAP transceiver with crystals for any two channel frequencies from list below; specify choices; 16 lbs.....\$179.95

CAP CRYSTALS; channel frequency: 4467.5, 4507.5, 4585, 4602.5, 4630 kHz; 1 lb.....ea. \$4.95

HW-18 SERIES SPECIFICATIONS—RECEIVER SECTION: Frequency Coverage: 4450 to 4650 kHz. **Channels:** 2. **Sideband:** USB. **Clarifier Range:** HW-18-1 ±100 Hz. **Sensitivity:** 1 uv input signal will provide at least a 15 dB signal-plus-noise-to-noise ratio. **Selectivity:** 2.1 kHz nominal @ 6 dB down, 6 kHz @ 50 dB down (3395 kHz filter). **Intermediate Frequency:** 3395 kHz. **Image Rejection:** 100 dB. **IF Rejection:** 50 dB. **Antenna Input Impedance:** 50 ohm, unbalanced. **Receiver Audio Response:** 400 to 3000 Hz. **Receiver Audio Power Output:** 1 watt. **Internal Speaker:** 8 ohm Impedance 4" x 6" **TRANSMITTER SECTION:** Frequency Coverage: 4450 to 4650 kHz. **Channels:** 2. **Transmitting Mode:** Upper sideband carrier suppressed, and low level carrier with sideband. **Frequency Accuracy:** .005% overall (after adjusting to channel frequency). **Clarifier Range:** ±100 Hz. **RF Power input:** 200 watts PEP. **Output Impedance:** 50 ohm balanced. **Transmitter audio response:** 400 to 3100 Hz. **Microphone:** High impedance ceramic. **Unwanted sideband suppression:** 45 dB min. below peak output with 1000 Hz modulation. **Carrier suppression:** 45 dB min. below peak output. **Ambient temperature range:** +10° to +110°F. **Controls:** Front panel: Volume with on/off switch, Reception, Mode, Meter, Channel, Clarifier, Meter Zero, Bias Adjust. Circuit board: Carrier null. Chassis rear: Mic. gain. **GENERAL SPECIFICATIONS:** Power requirements: 800 VDC @ 250 mA peak, 250 VDC @ 100 mA, —130 VDC @ 5 mA, 12.6 VAC or VDC @ 3.75 amperes. **Tube complement:** (3) 6EA8 microphone amp & AF cathode follower, transmitter IF amp & relay amp, RF amp & receiver mixer; (4) 6AU6 heterodyne osc., IF amp; (2) transmitter mixer; (1) 12BY7 transmitter driver; (1) 12AT7 prod. & carrier osc.; (1) 6E8B AF amp & AF output; (2) 6GE5 transmitter RF output. **Cabinet dimensions:** 6 1/4" H x 12 1/4" W x 10" D. Add 1" to height, width, & depth for gimbal bracket, knobs & connecting plugs. **Net weight:** 12 lbs.

• 200 watts PEP SSB input • 25 watts input with carrier for compatibility with AM stations • Employs Upper sideband, complies with new FCC rule effective June 21, 1968 which establishes a CAP SSB frequency tolerance of .005% until Jan. 1, 1973 and 50 Hz thereafter • Crystal filter sideband generation • 2 channels, switch selected, crystal controlled (tolerance .005%) • Fixed tuned for simple PTT operation • Transmit and receive frequencies locked together for true transceiver operation • Clarifier control adjusts transceiver frequency ±100 Hz • Relayless transmit-receive switching • Local-Distance switch prevents receiver overload from strong local stations • Built-in speaker • PTT mic. included • Carrier & sideband suppression 45 dB • Sensitivity 1 uv • Selectivity 2.1 kHz • 50 ohm coax output • Mobile or "fixed" use HP-13A & HP-23A power supplies • Mobile mount included • Requires only a voltmeter, ohmmeter & dummy load for alignment

Kit HW-18-1, CAP transceiver and crystals for any two channel frequencies from list below; specify choices; 16 lbs.....\$119.95



SB-620 Spectrum Analyzer

• 10 & 50 kHz sweep widths for single signal analysis • Variable width to 500 kHz for IF's above 455 kHz; up to 100 kHz for 455 kHz IF's • Log & Linear displays • Operates with common receiver IF's up to 6 MHz • SB-Series styling Kit SB-620, 15 lbs.....\$119.95



SB-610 Signal Monitor

• Accurate display of transmitted & received AM, CW, SSB &

The World's Most Popular



A DX-60B
\$81.95



B HR-10B
\$81.95



C HG-10B
\$44.95

A Heathkit DX-60B Transmitter

• New color styling—deep forest-green cabinet & pale gray-green panel • 90 watts phone or CW on 80 through 10 meters • Neutralized 6146 final amplifier for stable, dependable operation on all bands • Built-in low-pass filter to eliminate TVI problems • Grid-block keying—keys beautifully with the HD-10 Electronic Keyer • Easy access to the four crystal sockets • Full provisions for operation with the matching Heathkit HG-10B VFO • Operates at reduced power for Novice Class • Performance and styling mate to the HR-10B • No other transmitter in this price range will offer you more

The Transmitter You Never Outgrow. Run it at 75 watts CW input for novice operation—run at a full 90 watts input on phone or CW when you get your general class license.

Pi network output, Drive Level control, grid-plate current meter, and Drive Tune control permit peaking the DX-60B for best performance on any band, any power.

Kit DX-60B, 24 lbs. (less crystals) \$81.95
Kit GH-12A, PTT Mike, 2 lbs. \$8.95

DX-60B SPECIFICATIONS—Power input: 90 watts peak; controlled carrier phone, or CW. Output impedance: 50-75 ohm (coaxial). Output coupling: Pi-network. Operation: CW or AM phone—crystal or VFO control. Band coverage: 80 through 10 meters. Power Requirements: 120/240 V., 50/60 Hz, 225 watts. Dimensions: 13 3/4" W x 11 1/2" D x 6 1/2" H.

Old Brass Pounder Or Beginning Ham . . . He's Sure To Appreciate This Performance Packed Heathkit CW Transceiver

HW-16
\$109.95



• Provides optimum CW operation on the first 250 kHz of the 80, 40, & 15 meter bands • True "break-in" CW operation—solid-state TR switching & receiver muting • 75-watt input power level for novice class CW • Up to 90 watts input power for general class operation • Crystal control transmit with VFO receiver tuning • Provisions for VFO control in "transmit" with the Heathkit HG-10B VFO • High quality crystal lattice filter for CW selectivity comparable to "expensive" receivers • RF amplifier stage in receiver for better than 1 microvolt sensitivity • Built-in sidetone • Grid-block keying—keys beautifully with the Heathkit HD-10 Electronic Keyer • Easy to assemble and put on the air—requires only a VTVM, dummy load, and crystals for the bands in which you intend to operate

Regardless of his experience, every ham would like to put this rig on the air. And you can put it there for a lot less than you'd expect. The HW-16 features high stability thanks to a dual conversion superheterodyne circuit with a crystal controlled "front end" and low frequency local oscillator. Through the added gain of the dual conversion circuits, plus an RF amplifier stage, the HW-16 has the high sensitivity you need for working DX. And that RF amplifier means excellent image rejection for "clean" reception and superior weak signal capability. Because Heath engineers chose a crystal lattice filter similar to those used in the Heath SB-Series, you'll enjoy the sharp (500 Hz) selectivity you need to peel through crowded nighttime amateur bands. You'll discover the pleasure of pulling those weak DX signals up out of the mud for solid copy QSO's.

All you need in addition to your HW-16 are crystals in the band of your choice, headphones, or an 8 ohm speaker, an antenna, and a radiotelegraph key. The built-in sidetone lets you hear what you send, helps you build up speed, helps you develop a near-perfect fist. With built-in antenna change-over and automatic receiver muting, you'll never outgrow your HW-16. You can work fast break-in rag chews and high speed traffic nets with ease. Your HW-16 will stand up well against even the "expensive" rigs.

Amateur Gear Comes From Heath

A Heathkit Solid-State Electronic Keyer

• Dependable solid-state circuitry • Speed range—15 to 60 words per min., Slow-speed option—10 to 20 wpm • Self-completing dashes • Solid-state switching—no relays to stick or chatter—no contact bounce to punch holes in characters • Built-in paddle—"feel" is adjustable to your fist during assembly • Adaptable to either right or left handed operators • Engineered to convert easily to semi-automatic operation if desired • Variable dot-space ratio • "Hold" switch for transmitter tuning • Built-in side-tone and speaker • Built-in transformer-operated power supply isolates the keyer from the power line • Fused for protection • For use only with transmitters employing grid-block keying circuits, negative 105 volts @ 35 ma. maximum
Kit HD-10, 6 lbs. \$39.95



A HD-10
\$39.95

B Heathkit Solid-State Code Practice Oscillator

HD-16 Utilizes A Unijunction Transistor With Separate Controls To Vary Tone Frequency And Volume. Speaker is built in and jack for headphones is provided on front panel. For visual monitoring, just flip the front panel switch and watch the top-panel blinker light. Includes key with phone plug and cord. Requires two 9 volt transistor radio batteries and one "C" flashlight cell.
Kit HD-16, 3 lbs. \$9.95



B HD-16
\$9.95

C The Fast, Simple Way To Get Your FCC Ham Ticket

Course includes four handbooks from the American Radio Relay League covering all phases of licensing, station operation and telegraph code. Also includes Heathkit HD-16 code oscillator kit and 3 records that teach code by the unique "word method".

HDP-22, Complete Amateur Radio Starter Group, 6 lbs. \$18.95
HDP-32, Code Records Only, 2 lbs. \$9.50
HDP-42, ARRL Books Only (4), 2 lbs. \$2.50
Kit HD-16, Oscillator plus Key only, 3 lbs. \$9.95



C HDP-22
\$18.95

D The Radio Amateur's Handbook

Used by thousands of hams, engineers etc. as a reliable source of information on any phase of electronics & communications. Covers theory, construction & operating principles. "Plain talk" sections on basic electronics, HF, VHF, UHF receivers, transmitters, antennas.

HDP-293, 3 lbs. \$4.00



D HDP-293
\$4.00

E The Famous "Benton Harbor Lunch Boxes" . . . For 6 and 2 Meters

• Ideal for CAP, MARS, local net, or emergency • Crystal controlled AM transmitter—5 watt input • Tunable super-regen. receiver with RF stage—1 uv sensitivity • HW-30 2 meter model can operate on USCG Auxiliary freq. 143.28 MHz • Transceivers include ceramic mike, meter jack, and power cables for mobile operation • Crystals (not supplied) are in the 8 MHz range

Kit HW-29A (6 meter), 9 lbs. \$49.95
Kit HW-30 (2 meter), 9 lbs. \$49.95



E HW-29A
\$49.95

F Heathkit Mobile Speaker

A rugged, reliable 8 ohm speaker for mobile work. Features a sturdy steel cabinet finished in durable forest green wrinkle finish that matches Heathkit gear. Versatile gimbal mounting bracket. Measures 6-11/32" W x 4 1/4" H x 2 1/2" D.

Kit HS-24, 4 lbs. \$7.95



F HS-24
\$7.95

G Special SSB "Ham Radio" Microphone With Desk Stand

New, modern styling to match the pace set by Heathkit SB-Series equipment . . . this high impedance dynamic mike by EV is recommended for use with SB-Series gear. Features ideal response for clear, sharp SSB communications. Mike stand has grip-to-talk switch with lock position. Complete with wiring diagrams and cables.

HDP-21A, 4 lbs. \$29.95



G HDP-21A
\$29.95

Heathkit SWR Meter

• Shows antenna/transmission line match—indicating forward & reflected power & SWR • Covers 160-6 meters • Handles peak power well over 1 kw. Matches 50 or 75 ohm lines with wiring options
Kit HM-15, 2 lbs. \$14.95



HM-15

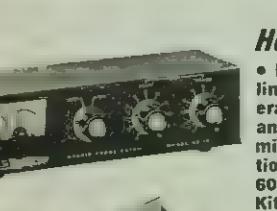


Heathkit Solid-State "Tunnel Dipper"

• Tunnel diode oscillator—no tubes • Covers frequency range of 3 to 260 MHz • Gear-drive tuning • Durable epoxy-coated plug-in coils • Coils color-matched to dial scales • Built-in coil storage
Kit HM-10A (less battery), 3 lbs. \$29.95



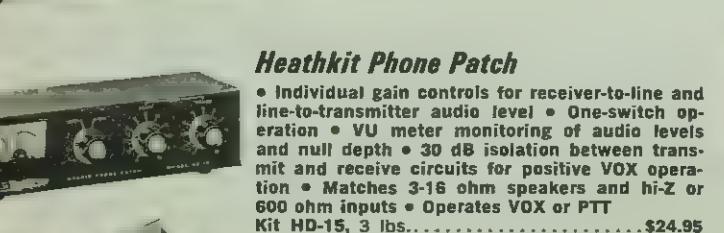
HM-10A



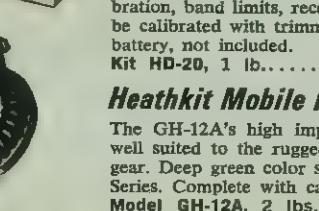
PM-2



PM-2



HD-20



GH-12A

• Tunnel diode oscillator—no tubes • Covers frequency range of 3 to 260 MHz • Gear-drive tuning • Durable epoxy-coated plug-in coils • Coils color-matched to dial scales • Built-in coil storage
Kit HM-10A (less battery), 3 lbs. \$29.95

All Kits On These 2 Pages Are Mailable

Heathkit Jr.® Fun And Learn Kits

35 Fun Projects For Youngsters To Build

• Radios, transmitters, intercom, alarms, PA systems, etc. • Safe battery operated • No soldering • Easy assembly/takedown • Simple instructions with pictures and diagrams • Text explains functions of circuit parts • Carton stores pieces

The Electronic Workshop "35" introduces the exciting world of solid-state electronics. Youngsters learn how modern circuits work while building them with real transistors, capacitors, resistors, loudspeakers, etc. Spring terminals eliminate all soldering.

Each project begins with a simple explanation of what the circuit does and how it is used. Then the young "engineer" builds the circuit with a detailed pictorial as his guide. Simple tests help him check his work. Each experiment is laid out on a schematic diagram that tells what each part does. Parts are identified by drawings and a dictionary of parts.

You Can Build All Of These Fascinating Circuits: Code Flasher, Continuity Tester, Battery Tester, Diode Tester, Transistor Tester, Rain Alarm, Timing Relay, Listening Device, Public Address Amplifier, Intercom, Voice Relay, Earphone Code Oscillator, Loudspeaker Code Oscillator, Flasher, Experimental Multivibrator, Electronic Organ, Burglar Alarm, Metronome, Siren, Light Meter, Light Sensing Alarm, Target "Hit" Alarm, Light Dependent Flasher, Light Dependent Oscillator, Sound Level Meter, Two, Three & Four-Transistor Radios, Automatic (Light Dependent) Radio, Field Strength Indicator, Code Transmitter, Voice Transmitter, Capacity Relay, Wheatstone Bridge, Capacity Bridge. Help a youngster discover the world of electronics . . . order the new JK-18 now.

Kit JK-18, 10 lbs. (4 "D" cells not included) \$19.95

Electronic Workshop "19" . . . Builds 19 Different Circuits

Perfect For Any Youngster Who Wants To Explore The Mysteries Of Electronics. Contains cartoon-illustrated principles of operation and simple, non-technical instructions for building 19 different projects . . . code flasher, burglar alarm, public address system, 5 different transistor radios, electronic timer, TV silencer, electric eye, metronome, code transmitter, voice transmitter, electronic flasher, intercom, audio signal injector, capacity & voice operated relays. Solderless, spring-type connectors speed assembly, and can be used repeatedly for building favorite projects. Operates on four safe C-size flashlight batteries (not included).

Kit JK-27, 4 lbs. (less batteries) \$13.95

Kit JK-37 9-Watt Solid-State Single-Channel Guitar Amplifier
\$29.95

• 7 transistor, 3 diode circuit for cool, instant operation . . . peak performance at all times . . . long, trouble-free life • 9 watts EIA music power, 18 watts peak power • Tremolo variable in rate and depth for a variety of effects • Two inputs for solo guitars • Volume and tone controls • All front-panel mounted controls and inputs • Carrying handle for easy portability • Red cabinet with red, silver & black striped grille cloth measures a compact 13½" W x 5½" D x 14" H

Perfect For That Youngster Just Starting To Play Guitar. Delivers a full 9 watts of music power, 18 watts peak power through a specially designed 8" speaker. Even has variable rate and depth tremolo so he can create a wide variety of effects. All controls are front panel mounted for complete command of all the action. Measures a compact 13½" W x 5½" D x 14" H and has a storage area in back. Goes together in only 5 hours. Runs on 120/240 VAC, 50-60 Hz.

Kit JK-37, 14 lbs. \$29.95

"Story Hour" Phonograph 4-Speed Monophonic

Kit JK-17
\$21.95

• Plays 16, 33½, 45 and 78 rpm • Takes 7, 10 & 12" mono records • Built-in 45 rpm adapter • Crystal cartridge with universal sapphire stylus for all types of records • Solid-State circuit for cool, instant operation, long life • 4" speaker • Steel top chassis plate • Tone arm locks in place

The first sounds this durable little phonograph makes will be like magic to your child, especially if you build it together. What a thrill for him to see it come to life! You can build it in an evening. Turntable mechanism comes preassembled; you build one small circuit board. Phonograph is protected by a tough case of wood and hardboard; detachable lid snaps securely in place. The ivory & desert gold polyethylene covering wipes clean.

Kit JK-17, 11 lbs. \$21.95

JK-17 SPECIFICATIONS—AMPLIFIER: Frequency Response: 80 Hz-10 kHz. Music Power Output: 600 Milliwatts EIA. Control: Off-On, Volume. Speaker: 4", 16 ohm Voice Coil. Transistor-Diode Complement: 4 transistors, 1-Silicon Diode. TURNTABLE: Type: 4 Speed Phonomotor. Turntable Diameter: 8½". Cartridge Type: Crystal. Stylus: Universal sapphire 0.7 to 3 mil for all records. GENERAL: Power Requirements: 117 VAC 60 Hz 14 watts. Size: 12½" W x 11¼" D x 5½" H.



Basic Electricity Kit-Course

Students & Beginners . . . discover the basic principles of voltage, current, and resistance as you build this handy DC Volt-Ohm Milliammeter. Then use this VOM for further study (EK-2A) or for your home workshop . . . text becomes a useful reference.

Kit EK-1 (less batteries), 4 lbs. \$24.95



Basic Radio-A 2-Part Course

Part I—Elementary Theory; you complete a regenerative receiver. Part II—complete a Two-Band Superheterodyne Receiver. Requires EK-1 VOM or equivalent. Basic Radio Part I (EK-2A), 7 lbs. \$21.50 Basic Radio Part II (EK-2B), 5 lbs. \$21.50 AK-8, Cabinet for completed receiver, 3 lbs. \$3.95



Basic Transistor Kit-Course

An Excellent Introduction For The Student, Or Refresher For The Technician . . . reveals the "How" and "Why" of transistors. Probes into the nature of matter. You learn theory and build a two-transistor radio, broadcast, amplifier, oscillator, and 2 station intercom. Kit EK-3, Basic Transistors, 4 lbs. \$19.95

Citizen's Band Radio

Heathkit Solid-State 5-Watt CB Transistor . . . 23 Crystal Controlled Channels . . . At New Low Prices

• 14 transistor, 6 diode circuitry • Provision for 23 crystal-controlled transmit & receive channels • Crystal pack available • Full 5 watt performance . . . a minimum of 3 watts RF output, plus 3 watts audio modulating power • Front panel "S" meter • Adjustable squelch control • Automatic noise limiter • Built-in PM speaker • ½ uv sensitivity • Easy to build circuit board construction • Gimbal mounting bracket • Attractive Turner Ceramic PTT mike • Die-cast, chrome-plated front panel with charcoal gray cabinet • Fits under dash of your car, boat, jeep, truck, etc.

Kit GW-14A, 8 lbs. (less crystals) \$76.95
Assembled GWW-14A, 8 lbs. (less crystals) Now Only \$109.95
GWS-14A, System: kit (GW-14A) plus 23 channel crystal pack, 9 lbs. \$152.95
GWW-14AS, System: assembled model (GWW-14A) plus 23 channel crystal set installed, 9 lbs. \$184.95
Kit GWA-14-1, AC Power Supply, 5 lbs. \$14.95
Kit GWA-14-2, 23 Channel Crystal Pack, 1 lb. \$79.95

GW-14 SPECIFICATIONS—RECEIVER SECTION: Intermediate frequency: 455 kHz. Sensitivity: ½ uv or less for a 10 dB signal plus noise to noise ratio. Selectivity: Adjacent channel attenuation is down 30 dB. Audio power output: 3 watts minimum. TRANSMITTER SECTION: Nominal power input to final RF amplifier: 5 watts. Frequency control: 3rd overtone quartz crystal as selected by the 23-position channel selector switch. Frequency control effectiveness: Operating frequency will be within .005% of nominal crystal frequency over an ambient temperature range of -20 to +130 degrees F. Modulation: High level AM limited to less than 100%. Output impedance: 50 ohms nominal. Output circuit: Twin "Pi" matching network. Power output: 3 watts minimum into 50 ohm load. GENERAL—Controls: Squelch, off/on volume; channel selector. Tuning meter: For receiving, S 9 corresponds to approximately 100 uv signal input. For transmitting, the meter indicates the presence of power output and modulation peaks. Power requirements: Positive 12 volts system (13.5 volts); receiver current drain, standby—120 ma; transmitter current drain—750 ma. Dimensions: 2½" H x 7" W x 11" D.

Kit GW-14A
Was \$89.95
Now Only
\$76.95
GWS-14A System
(Includes kit GW-14A & 23 channel crystal pack)
\$152.95

Wired GWW-14A
Was \$124.95
Now Only
\$109.95
GWW-14AS System
(Includes assembled
GWW-14A & 23 channel
crystal pack)
\$184.95



5-Channel, 5-Watt CB Transceiver . . . Choice Of Fixed Or Mobile

• 5-crystal-controlled transmit & receive channels • Superhet receiver with RF stage • Built-in squelch & automatic noise limiter • Push-to-talk microphone • Easy to build

A Host of Operating Conveniences like 5 crystal-controlled transmit and receive channels . . . sensitive superhet receiver with RF stage . . . built-in squelch and automatic noise limiter . . . built-in speaker plus external connectors for adding an extra speaker if desired . . . relayless push-to-talk circuitry and rugged two-tone brown metal cabinet. Includes PTT microphone, power cable and crystals for one channel (specify frequency). Choose the AC model for "fixed," and the DC version for "mobile" operation. Choose them both and save an extra 5%. Use must comply with FCC regulations.

Kit GW-22A (117 v. AC), 13 lbs. \$49.95
Kit GW-22D (6 or 12 v. DC), 13 lbs. \$54.95

GENERAL DESCRIPTION—Receiver: 5-tube superheterodyne with RF stage, crystal-controlled, on up to 5 of the 23 channels as determined by the particular crystal(s) installed. Sensitivity: ½ microvolt for a 10 dB signal-to-noise ratio. Transmitter: Power input to final RF amplifier, nominal 5 watts. Nominal power requirements: GW-22A—117 volts, 50/60 Hz AC, 50 watts. GW-22D—6 volts DC, 8.0 amperes; 12 volts DC, 4.5 amperes. Dimensions: 9½" D x 6½" H x 9½" W.



NOTE: CAP Crystals at 26.620 MHz available for all models. Extra Transmit & Receive Crystals. Only \$1.99 each. Specify Heath Transceiver model. 1 lb.

(A) Extra Safe Heathkit Soldering Iron With 3 Heat Ranges

This new Heathkit soldering iron is the perfect choice for kit building . . . its light weight and good balance make it easy to handle and the handy stand with metal cage keeps the iron safe and secure when not in use. Three ways safe . . . new three-wire line cord . . . isolation transformer operated . . . and the 25-watt GE midget iron runs on only 6 volts. Non-corroding ¼" metal tip. Three heat ranges; low, medium and high, give versatile performance for all types of circuit work. Comes with a six foot cord and runs on 117 VAC.

Kit GH-17A, 5 lbs. \$14.95

(B) Weller W-PS 25-Watt Pencil Soldering Iron

Develops 860° heat fast. ½" iron-clad screwdriver tip. 117 v. AC 60 Hz operation. Lightweight, UL and CSA approved. Model GDP-207, 1 lb. \$3.82

(C) American Beauty Soldering Iron

Balanced, lightweight, easy-to-handle. 30-watt element, iron-clad tip won't corrode, doesn't need frequent tinning. Model GDP-105, 1 lb. \$5.40

(D) Kit-Builders Tool Set

• Combination wire stripper & diagonal sidecutter • Midget long-nose pliers • 3 screwdrivers (3/32", 1/8", 5/32") • "Little Dandy" soldering iron • 5 nut drivers (5/16", 1/4", 5/16", 3/8", 1/2") • Nutstarter, soldering aid, radio solder, and "Kit-Builders Guide." Model GH-25, 4 lbs. \$16.95

(E) Vaco Hollow Shaft Nut Driver Set

7 drivers—3/16", 1/4", 5/16", 1/2", 3/8", 7/16", 1/2". Self-supporting rack. Color-coded plastic handles. Model GDP-204, 3 lbs. \$6.42

(F) Speedex Wire & Cable Stripper

Graduated jaws accept No. 10, 12, 14, 16, 22 wire. Model GDP-663, 2 lbs. mfrs. list \$9.95. Only \$5.89

(G) Heathkit Motor Speed Control

Saves power, blades, bits, saws, etc. Use with tools, appliances with universal AC-DC motor rating up to 15 amps only. Not for AC induction motors. Kit GD-973A, 3 lbs. \$17.50

(H) Z-Lyte Extension Lamp Kit

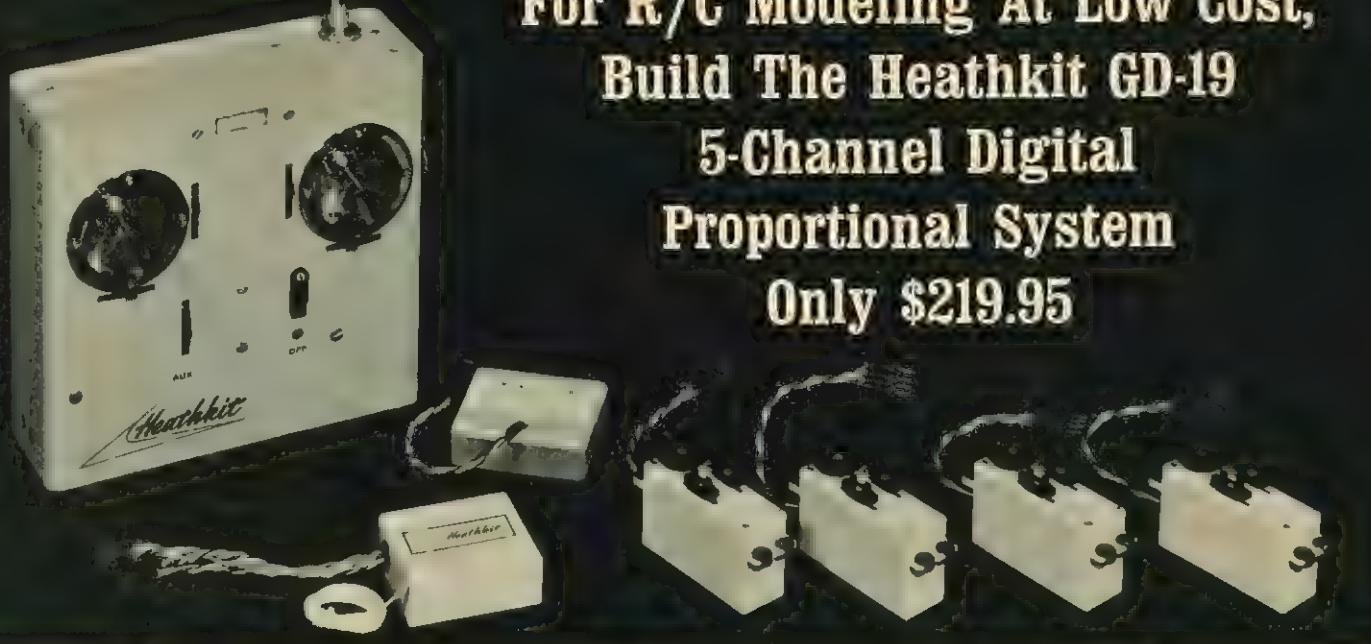
• Assembled extension arm just attach socket, shade & cord • 45" reach, 360° sweep • Vented shade • Movable • U.L. approved • Less incandescent bulb. Kit GDP-202, 5 lbs. mfrs. list \$14.50. Only \$9.95

Workshop Accessories To Make Your Kit Building Even Easier



All Kits On These 2 Pages Are Mailable

For R/C Modeling At Low Cost,
Build The Heathkit GD-19
5-Channel Digital
Proportional System
Only \$219.95



New—Smaller, Lighter Receiver New—Kraft Control
Sticks New—3 Choices of Bands . . . 27, 53, or 72 MHz
Only \$219.95 with four servos

• Powerful transmitter has preassembled, prealigned RF circuitry • New Kraft control sticks with thumb lever coarse adjustment plus Trim Controls that do not change stick centering • Easily reversed servo travel • Switch-locked transmitter prevents accidental turn-on • Collapsible antenna • New flat-pack rechargeable nickel-cadmium transmitter & receiver batteries • New 2.3 oz. miniature receiver features space-age ceramic filters in the IF for high selectivity, extra reliability and no IF alignment ever • Unaffected by noise or temperature variation • Exclusive Heath space and weight-saving metal-type terminal blocks • High reliability variable-capacitor servos for extended life • Two linear outputs (one with vertical tabs) plus rotary • Choice of five operating frequencies in each of three bands—27, 53 or 72 MHz • Buy the complete system kit (supplied with a soldering iron) or buy components separately—new receiver is fully compatible with previous Heathkit GD-47 R/C System

Control You Can Count On . . . that's the new Heathkit GD-19. The new slim line transmitter case has a high output, preassembled & prealigned RF circuit for a sure signal. New Kraft sticks deliver precise control and servo travel and operational mode are easily changed. Built-in circuit charges both receiver & transmitter flat-pack nickel-cadmium batteries with one cord. The new miniaturized receiver in a virtually indestructible nylon case fits almost anywhere, and three ceramic IF filters increase selectivity and eliminate IF alignment. A double-tuned front end, RF amplifier and dual AGC combine to give interference free reception too. Four versatile, high reliability variable capacitor servos, exclusive Heath terminal blocks, 16 oz. flying weight, choice of bands and fast, enjoyable assembly round out the picture of the most advanced R/C system ever produced. Experience a new high in R/C modeling . . . order your GD-19 now.

System Kit GD-19, all system parts; specify freq. desired; 11 lbs. \$219.95
Kit GDA-19-1, transmitter, battery, charging cord; specify freq., 5 lbs. \$86.50
Kit GDA-19-2, receiver only; specify freq., 1 lb. \$49.95
Kit GDA-19-3, receiver battery pack only, 1 lb. \$9.95
Kit GDA-19-4, one servo only, 1 lb. \$21.50
Kit GDA-47-6, plug conversion kit for using new GDA-19-2 receiver with previous GD-47 Servos, 1 lb. \$2.95
Model GDP-59, 1 lb., Soldering Iron. \$7.95



New Heathkit GD-69 "Thumb Tach"® . . . Measures RPM On Any Model Engine

• All solid-state design • Minimum current drain gives long battery life • 0-5000 RPM range for idle adjustments . . . 0-25,000 RPM for top end readings • Zener diode regulated meter circuit and precision switching resistors keep "Thumb Tach" accurate even with aging battery • Dozens of uses—needle valve adjustments . . . differences in glow plug performance . . . select gear trains & props . . . indicates power loss from aging or worn engine . . . peak engine for changes in RPM you can't hear

GD-69 \$19.95

GD-69 SPECIFICATIONS—Range: 0-5000 RPM & 0-25,000 RPM. Light intensity: Dusk to bright sunlight. Pulse ratio: 1, 2, or 3 input pulses per RPM. Battery requirements: 9 V. NEDA #1604 (not supplied). Finish: Blue wrinkle. Accuracy: 3%. Dimensions: 1-17/32" H x 2 1/2" W x 5 3/4" L. Temperature range: 0° to 160°F. Net weight: 10 oz. less battery.

Heathkit® Deluxe Shortwave Receivers

New Heathkit GR-78 Six-Band General Coverage Receiver . . . Tunes 190 kHz To 30 MHz . . . Solid-State Portable Convenience



GR-78
\$129.95

Compact, Well-Engineered Layout,
for fast assembly & long, dependable life. Note liberal use of shield-
ing for extra stability.

A Highly Versatile General Receiver . . . for SWL's who appreciate solid tuning . . . for hams who need a standby receiver they can depend on . . . for the "portable people" who want a radio that's ready to go when they are. The new GR-78 fills all these needs & more . . . here's why.

190 kHz—30 MHz Coverage . . . hear intriguing foreign broadcasts, ships at sea, ham operators & your own local AM stations at the turn of a knob. Bandspread Tuning makes it easy to separate closely spaced stations & can be calibrated for either Shortwave or Amateur bands. Select AM or CW/SSB reception with the rocker-type switch. The switchable Automatic Noise Limiter cuts out annoying noise & static, and Automatic Volume Control can be switched in to keep volume constant.

Other Features include a built-in Relative Signal Strength meter, external antenna connector, built-in 500 kHz crystal calibrator for exact dial calibration, receive/standby switch & muting connection for use with ham transmitters and completely portable operation from a nickel-cadmium battery and built-in charger.

For The Best Buy In General Coverage Receivers, order your GR-78 now. Kit GR-78, 14 lbs. \$129.95

GR-78 SPECIFICATIONS—Frequency coverage: Band A, 190 kHz-410 kHz; Band B, 550 kHz-1300 kHz; Band C, 1.3 MHz-3.0 MHz; Band D, 3.0 MHz-7.5 MHz; Band E, 7.5 MHz-18.0 MHz; Band F, 18.0 MHz-30 MHz. Meter: Indicates relative signal strength. Intermediate frequency: Band A thru E: 455 kHz; Band F: (Double conversion): 1st IF, 4.034 MHz; 2nd IF, 455 kHz. Sensitivity: AM (Low End): Band A, 10 uV; Band B, C & E, 3 uV; Band D, 2 uV; Band F, 2 uV. (High End): Band A, 3 uV; Band B, 1 uV; Band C, 0.6 uV; Band D & F, 0.3 uV; Band E, 0.2 uV; CW/SSB: (Low End): Band A, 6 uV; Band B, D & F, 2 uV; Band C, 1.5 uV; Band E, 3 uV; (High End): Band A, 2 uV; Band B, 0.7 uV; Band C, 0.4 uV; Band D, E & F, 0.2 uV. Selectivity: 7.5 kHz ± 1@ 6 dB down. Audio output: 300 milliwatts @ 10% distortion. Battery: 9.6 VDC 500 mAh Nickel-Cadmium rechargeable. Battery charge rate: The battery is always being charged at 20 to 25 mA when the built-in trickle charging circuit is connected to an external power source with the Receiver turned off. A full battery charge will be maintained if the Receiver is connected to an external power source and used an average of 5 hours daily at a normal listening level. Panel controls: Bandspread; AF Gain-Off; RF Gain; Panel light; RCV-STBY; CAL; AM-CW/SSB; AVC-MVC; Bandswitch; Main Tuning. Rear panel: Muting; External Antenna; 12 VDC Receptacle; 120 VAC Receptacle; Phone Jack. Overall size: 6 1/4" H x 11 1/2" W x 9" D. Net weight: 11 lbs.

*Signal level for 10 dB signal + noise/noise ratio.



SB-310
\$259.00
(less speaker)

Heathkit SB-310 Professional Shortwave Receiver . . . Tunes Six Shortwave Broadcast Bands . . . Three Amateur Bands . . . CB Band . . . Optional SBA-310-3 Kit Replaces 11 Meter CB With 13 & 15 Meter Bands

• Covers six shortwave broadcast bands (49, 41, 31, 25, 19 & 16 meters) . . . 80, 40 & 20 meters amateur bands . . . 11 meter CB + 5 kHz crystal filter included for AM, SSB and CW listening • 10-tube circuit • Crystal-controlled front-end for same rate tuning on all bands • 1 kHz dial calibrations—100 kHz per dial revolution • Separate RF and AF gain controls • Pre-built & Aligned LMO • Product detector for SSB • Automatic Noise Limiter • Calibrated "S" meter • Headphone jack • "Hi-Fi" output for connection to external audio system • "Subpack" packaging for fast, easy assembly • World Radio-TV handbook included • Optional SBA-310-3 Kit adds 13 & 15 Meter Coverage in place of 11 meter CB

Any SWL would be proud to own the superb SB-310. 10 switch-selected bands—49, 41, 31, 25, 19 and 16 meter shortwave, 11 meter CB and 80, 40 and 20 meter ham bands. A 5 kHz crystal filter is included for crystal clear AM listening. Optional CW and switch-selected USB/LSB narrow bandwidth filters are available for optimum reception.

Famous Heath SB-Series Features . . . crystal-controlled front end for same rate tuning on all bands . . . truly linear tuning with 1 kHz dial calibrations . . . bandspread equal to 10 feet per MHz . . . prebuilt and aligned Linear Master Oscillator for "solid" tuning . . . separate RF and AF gain controls . . . bandspread equal to 10 feet per MHz . . . prebuilt and aligned Linear (AM) and product (SSB, CW) detectors . . . built-in 100 kHz crystal calibrator . . . headphone jack for DX-ing . . . and many more professional features. Requires only a VTVM for final alignment. Choose a lifetime of the finest shortwave listening available . . . order your SB-310 now.

Kit SB-310 (less speaker), 24 lbs. \$259.00

Kit SB-600, 8 ohms, 6" x 9" speaker, 6 lbs. \$19.95

SBA-310-2, Optional deluxe CW filter for optimum CW (400 Hz @ 6 dB down; 2 kHz max. @ 60 dB down), 1 lb. \$21.95

SBA-310-1, Optional SSB filter plus crystal for switch selection of USB & LSB (2.1 kHz @ 6 dB down; 7 kHz max. @ 60 dB down), 1 lb. \$23.95

SB-310-2, Optional deluxe SSB filter plus crystal for switch-selection of USB & LSB (2.1 kHz @ 6 dB down; 5 kHz max. @ 60 dB down). Provides best SSB selectivity for maximum adjacent signal rejection. 1 lb. \$39.95

SBA-310-3, Optional 13 & 15M modification kit, 1 lb. \$9.95

SB-310 SPECIFICATIONS—Frequency range (Megahertz): 3.5 to 4.0, 5.7 to 6.2, 7.0 to 7.5, 9.5 to 10.0, 11.5 to 12.0, 14.0 to 14.5, 15.0 to 15.5, 17.5 to 18.0, 26.9 to 27.4. Intermediate frequency (IF): 3.395 MHz. Frequency stability: Less than 100 Hz drift per hr. after 20 min. warmup under normal ambient conditions. Less than 100 Hz drift for ±10% line voltage variation. Sensitivity: Less than 0.3 uV for 10 dB signal-plus-noise ratio to noise ratio for SSB operation. Selectivity: AM, 5.0 kHz @ 6 dB down; 15 kHz max. @ 60 dB down (crystal filter supplied). CW, 400 Hz @ 6 dB down; 2.0 kHz max. @ 60 dB down (crystal filter available as an accessory). SSB, 2.1 kHz @ 6 dB down; 5.0 kHz max. @ 60 dB down (deluxe SSB crystal filter available as an accessory), or 2.1 kHz @ 6 dB down; 7.0 kHz max. @ 60 dB down (regular SSB crystal filter available as an accessory). Image rejection: 60 dB or better. Dial accuracy: ELECTRICAL: Within 400 Hz on all bands, after calibration at nearest 100 kHz point. VISUAL: Within 200 Hz on all bands. Calibration: Every 100 kHz. Dial backlash: No more than 50 Hz. Antenna input impedance: 50 ohms, nominal unbalanced. Audio output impedance: "Hi-Fi" cathode follower output, 1000 ohms. Matching speaker, 8 ohms. Matching headphones, high impedance. Audio output power: 1 watt with less than 8% distortion. Power requirements: 105-125 or 210-250 V AC, 50-60 Hz, 50 watts. Cabinet dimensions: 14 1/2" W x 6 1/4" H x 13 1/2" D. Net weight: 17 lbs. External connections: Front panel: phones. Rear Apron: antenna, mute 500 ohm audio output, speaker 8 ohm, hi-fi output, 1 spare socket, line cord socket. Tube complement: 10 tubes (13 functions). Diode complement: 8.

Low Cost, High Performance Shortwave Receivers



For The Seasoned SWL . . . GR-54 5-Band Shortwave Receiver . . . Includes Long-Wire Antenna

• 5 bands . . . 3 shortwave bands cover 2 MHz to 30 MHz, plus 550 kHz to 1550 kHz AM broadcast band, & 180 kHz to 420 kHz aeronautical & radio navigation band • Tuned RF stage for greater sensitivity • Crystal filter for sharp selectivity • Separate product detector for efficient SSB & CW reception • Switchable upper or lower sideband mode position • Built-in relative signal strength indicator • Electrical bandspread tuning • 6 tube—6 diode superhet circuit plus 2 silicon diode rectifiers • Built-in code practice monitor plus code key jack • Automatic noise limiter, automatic volume control & antenna trimmer control • "Velvet-touch" 16 revolution main tuning • Built-in 4" x 6" PM speaker • Built-in AM antenna plus external antenna terminals • Standard jack accepts headphones or external speaker • Safe transformer-operated power supply • Sleek low-boy styling—Charcoal gray metal cabinet • Antenna included



SWL Station Guide

Lists Worldwide AM, FM, TV, and Shortwave stations, call signs, frequencies, transmitter power, address for QSL cards, program details, broadcast times. Over 300 pages. **GDP-315, 2 lbs.** \$5.95



Heathkit "Q" Multiplier

Designed for use with GR-64 or similar receivers with 450 to 500 kHz IF's. Creates extra-sharp selectivity through an effective "Q" of 4000, and provides notch for adjacent signal attenuation. 120/240 V 50/60 Hz AC power supply. **Kit GD-125, 3 lbs.** \$14.95

Listen To The Sound Of An Action-Filled World On This Heathkit 4-Band Receiver

• Covers 550 kHz to 30 MHz—includes broadcast plus 3 shortwave bands • 4-tube superhet circuit plus 2 silicon rectifiers • Built-in 5" PM round speaker • Illuminated 7" slide-rule dial with logging scale • Lighted bandspread tuning dial • Relative signal strength indicator • Variable BFO control • Built-in AM rod antenna • Simple circuit board construction • Headphone jack • Charcoal gray metal cabinet, black panel with green & white markings **Kit GR-64, 15 lbs.** \$42.50

Hear Live Broadcasts From Around The Globe . . . China, France, Latin America, hundreds of foreign countries. Tune in ham & CB operators, ship-to-shore, Voice of America, Radio Moscow and popular AM. Also features

high voltage, transformer-operated power supply; electrical bandspread tuning; terminals for external antenna; Q-multiplier input and noise limiter on/off switch. Assemble in 8-10 hours.

Kit GR-64, 15 lbs. \$42.50

GR-64 SPECIFICATIONS—Frequency range: 550 kHz to 30 MHz in four bands. Controls: General coverage tuning, Bandspread tuning, Bandswitch, Noise Limiter—ON/OFF, Phone-Standy-CW switch, BFO control, Audio Gain, AC-ON/OFF, Headphone jack, Q-multiplier input. Power requirements: 120/240 V 50/60 Hz AC, 30 watts. Dimensions: 13 1/2" W x 6" H x 9" D.

Low Cost Starter Kit For Beginning SWL's

• Covers 150 kHz to 18 MHz in 4 bands • Shock-free, transformer operated power supply • Provisions for long and short antennas • Headphone jack for private listening • Built-in speaker • Front panel controls for Volume, Regeneration, Band-switching, Main Tuning and Fine Tuning • Easy to build—from parts to programs in 6 short hours **Kit GR-81, 12 lbs.** \$24.95

GR-81 SPECIFICATIONS—Frequency coverage: 140 kHz to 18 MHz on four bands. Tube complement: 12AT7 Detector, 1st Audio, 50CS3 Audio Output, 35W4 Rectifier. Power requirements: 105-125 V 50/60 Hz only, 30 watts. Fused. Controls: Main tuning (calibrated), Bandspread, Bandswitch, Regeneration, on/off volume, phone jack. Dimensions: 10" W x 7" H x 7" D.



Open Your Heath Account—No Money Down Up To \$300—Up To 18 Months To Pay—See Order Blank For Details

Special Purpose & Exploration Gear

Hear Police, Fire, Marine & Weather Broadcasts With This Heathkit

VHF-FM Monitor Receiver . . . Covers 152 to 174 MHz

• Receives both narrow and wide band FM signals • 152-174 MHz coverage • High sensitivity and selectivity • Six-to-one vernier tuning control plus single channel crystal control • Adjustable squelch control quiets background noise • All solid-state construction for long, trouble-free life • Portable battery operated • Convenient carrying handle doubles as a stand • Built-in whip antenna • Jack for external antenna • Accessory AC power supply available • Rugged brown leatherette case • One circuit board & preassembled & aligned tuner save builder time

The Heathkit GR-88 is easy to build, smooth to operate and easy to take along . . . anywhere. To make constant monitoring of a particular frequency easier, just plug in a crystal, tune to the approximate frequency, then flip the panel switch to "Xtal" and you're on frequency. The accessory AC power supply, Kit GRA-88-1, fits inside the GR-88 case. Handle turns 90 degrees from vertical to prop up unit on a table.

Kit GR-88, 5 lbs. \$49.95

Kit GRA-88-1, Accessory AC Power Supply, 1 lb. \$7.95

GR-88 SPECIFICATIONS—Tuning range: 152-174 MHz. Antenna input: 50-75 ohms. Sensitivity: 2.0 uV or less for 20 dB quieting. IF Frequency: 10.7 MHz. IF Selectivity: ± 40 kHz @ 6 dB down. Image rejection: 40 dB or greater. IF Rejection: 80 dB or greater. Audio output: 250 mW of less than 10% distortion. Speaker: 3" round, 24 ohms, permanent magnet. Transistor complement-tuner: (2) 2SC784 and (1) SE-5006. Transistor complement-IF & Audio: (5) 2N2369, (4) 2N3393, (1) X29A829, (1) 2N2430, (1) 2N2431, (1) 40481. Diode complement: (2) 1N191 and (2) 1N4646. Batteries: Six 1.5 volt "C" cells, not supplied. Dimensions: 8 1/4" W x 7 1/2" H x 3 1/2" D. Net weight: 3 lbs. without batteries.



Monitor The Aircraft Band With This Heathkit GR-98

• Tunes the complete Aircraft Band—108 to 136 MHz • All solid-state circuitry • Completely portable • Built-in whip antenna • Handsomely styled, rugged brown leatherette case with tilt-stand/carrying handle combination • Excellent sensitivity and selectivity • Vernier tuning • Adjustable squelch control • Single channel crystal-control feature • Built-in external antenna jack • Accessory AC power supply available • Fast, enjoyable assembly with circuit board construction and factory assembled and aligned tuner

Kit GR-98, 5 lbs. \$49.95

Kit GRA-88-1, Accessory AC Power Supply, 1 lb. \$7.95

GR-98 SPECIFICATIONS—Tuning range: 108-136 MHz. Antenna input: 50 to 75 ohms. Sensitivity: 1.5 uV or less for 10 dB signal-to-noise plus noise ratio @ 1000 Hz 30% modulation. IF Frequency: 10.7 MHz. IF Selectivity: 40 kHz @ 6 dB down; 100 kHz @ 30 dB down. Image rejection: 40 dB or greater. IF rejection: 80 dB or greater. Audio output: 250 milliwatts at less than 10% distortion. Speaker: 3" round, 24 ohm, permanent magnet. Transistor complement-tuner: (2) 2SC784 and (1) SE-5006. Transistor complement-IF & Audio: (4) 2N2369, (2) X29A829, (1) MPF-105, (1) 2N2430, (1) 2N2431, and (1) 40481. Diode complement: (2) 1N191, (1) 1N4646 and (1) S-160. Batteries: Six 1.5 volt size "C" cells (not included). Dimensions: 8 1/4" W x 7 1/2" H x 3 1/2" D. Net weight: 3 lbs. without batteries.



Deluxe 10-Band AM/FM/Shortwave Transistor Portable

• Tunes Longwave, Standard Broadcast, FM and 2 MHz-22.5 MHz Shortwave bands • 16 transistors, 6 diodes & 44 factory assembled and pretuned circuits & two separate tuners & IF's • Battery saver switch • Optional charger/converter • Rotating tuning dial • Dial light • Earphone & Jack • AFC for FM

Kit GR-43A, 19 lbs. \$149.95

Model GRA-43-1, Converter/Charger for 117 V. 60 Hz AC, 1 lb. \$6.95

GR-43 SPECIFICATIONS—**AM SECTION**: Tuning range: Longwave—150-400 kHz; Broadcast—550-1600 kHz; Shortwave—2-4 MHz; 4-9 MHz; 31 M—9.2-10.2 MHz; 25 M—12.1-12.4 MHz; 19 M—14.5-16.1 MHz; 16 M—16.8-18.8 MHz; 13 M—20.2-22.4 MHz. Sensitivity: At external antenna input for a 10 dB signal-plus-noise to noise ratio. **Longwave**—12 uv; **Broadcast**—10 uv; 2-4 MHz—5 uv; 4-9 MHz—3 uv; 31 M—3 uv; 25 M—2 uv; 16 M—2 uv; 13 M—2 uv. **Intermediate frequency (IF):** 455 kHz. **FM SECTION:** Tuning range: 88-108 MHz. Sensitivity: 1/2 uv for 20 dB of quieting; 2 uv for 30 dB of quieting; 3 uv for 40 dB of quieting. **Intermediate frequency (IF):** 10.7 MHz. **GENERAL:** Audio output: Normal; 500 mw; Battery Saver: 160 mw. Speaker: 4x6" oval; permanent magnet; 3.2 ohm voice coil. Batteries: 6 size D cells; 1 size C Cell (not supplied). Dimensions: 13 1/2" W x 5 1/4" D x 10 1/4" H including handle.

GR-43A \$149.95

GR-43 SPECIFICATIONS—**AM SECTION**: Tuning range: Longwave—150-400 kHz; Broadcast—550-1600 kHz; Shortwave—2-4 MHz; 4-9 MHz; 31 M—9.2-10.2 MHz; 25 M—12.1-12.4 MHz; 19 M—14.5-16.1 MHz; 16 M—16.8-18.8 MHz; 13 M—20.2-22.4 MHz. Sensitivity: At external antenna input for a 10 dB signal-plus-noise to noise ratio. **Longwave**—12 uv; **Broadcast**—10 uv; 2-4 MHz—5 uv; 4-9 MHz—3 uv; 31 M—3 uv; 25 M—2 uv; 16 M—2 uv; 13 M—2 uv. **Intermediate frequency (IF):** 455 kHz. **FM SECTION:** Tuning range: 88-108 MHz. Sensitivity: 1/2 uv for 20 dB of quieting; 2 uv for 30 dB of quieting; 3 uv for 40 dB of quieting. **Intermediate frequency (IF):** 10.7 MHz. **GENERAL:** Audio output: Normal; 500 mw; Battery Saver: 160 mw. Speaker: 4x6" oval; permanent magnet; 3.2 ohm voice coil. Batteries: 6 size D cells; 1 size C Cell (not supplied). Dimensions: 13 1/2" W x 5 1/4" D x 10 1/4" H including handle.

GR-43A \$149.95

Model GRA-43-1, Converter/Charger for 117 V. 60 Hz AC, 1 lb. \$6.95

GR-43 SPECIFICATIONS—**AM SECTION**: Tuning range: Longwave—150-400 kHz; Broadcast—550-1600 kHz; Shortwave—2-4 MHz; 4-9 MHz; 31 M—9.2-10.2 MHz; 25 M—12.1-12.4 MHz; 19 M—14.5-16.1 MHz; 16 M—16.8-18.8 MHz; 13 M—20.2-22.4 MHz. Sensitivity: At external antenna input for a 10 dB signal-plus-noise to noise ratio. **Longwave**—12 uv; **Broadcast**—10 uv; 2-4 MHz—5 uv; 4-9 MHz—3 uv; 31 M—3 uv; 25 M—2 uv; 16 M—2 uv; 13 M—2 uv. **Intermediate frequency (IF):** 455 kHz. **FM SECTION:** Tuning range: 88-108 MHz. Sensitivity: 1/2 uv for 20 dB of quieting; 2 uv for 30 dB of quieting; 3 uv for 40 dB of quieting. **Intermediate frequency (IF):** 10.7 MHz. **GENERAL:** Audio output: Normal; 500 mw; Battery Saver: 160 mw. Speaker: 4x6" oval; permanent magnet; 3.2 ohm voice coil. Batteries: 6 size D cells; 1 size C Cell (not supplied). Dimensions: 13 1/2" W x 5 1/4" D x 10 1/4" H including handle.

GR-43A \$149.95

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GR-43A \$149.95

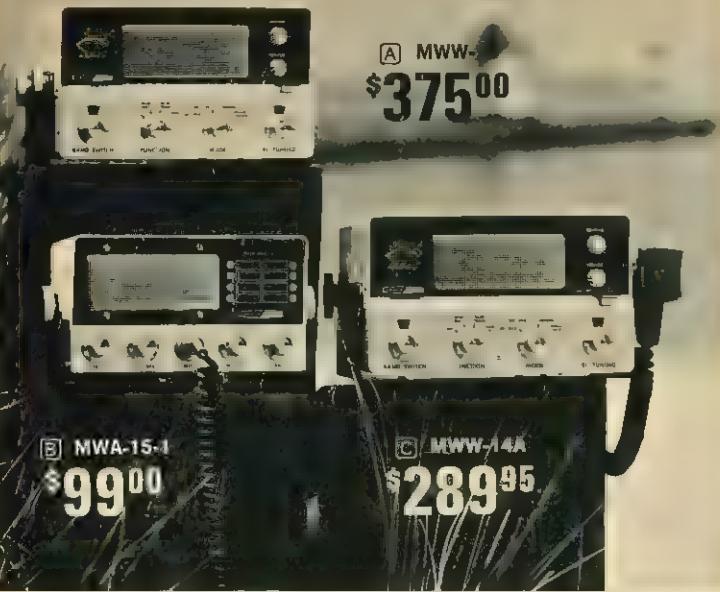
Model GRA-43-1, Converter/Charger for 117 V. 60 Hz AC, 1 lb. \$6.95

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GR-43A \$149.95

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Heath Radiophones

B Full Remote Control Operating Facilities For Heath Radiotelephones

The smartest remote control to complement the bridge of any boat. Full remote control for MWW-14A or MWW-15 radiophones. Includes on/off, volume, squelch, mode switch, and channel selector. Telephone handset. Universal gimbal mounting bracket. Completely factory assembled with detailed installation/operating manual included. Styled to match MWW-14A & MWW-15. Includes 25' of interconnecting cable with all connectors preassembled.

Choose MWW-15R Or MWW-14AR For The Radiophone And Remote Combination... all channel switching provisions are factory installed and both units are ready to place in your boat. If you already own an MWW-14A or MWW-15, order MWA-15-1... this includes the Remote, all necessary hardware (25' of cable with connectors assembled), plus channel switching drive motor and instructions for installation in your Heath radiophone. Assembled MWA-15-1, 10 lbs. \$99.00

C Heath MWW-14A... Unequalled Value & Performance In A 75 Watt Radiotelephone

- 150 watt input. Very low current drain for a 150-watt 'phone
- 8 crystal-controlled channels. Covers 2-3 & 4-5 MHz marine bands
- Tunes AM broadcast. Built-in 15 watt deck hailer. Full provisions for use with MWA-15-1 Remote Unit. High-performance solid state receiver with RF amplifier stage. Ceramic Transistors® for more selectivity. Built-in heavy duty power supply. FCC type-accepted for commercial (party boat) use & DOT approved.
- Completely assembled & tested. Owner's manual includes all information for installation & operation.

A Heath 150-Watt Radiotelephones—Performance Plus

Advanced Features Not Found On Many Other Radiotelephones—Never At Such A Low Cost... such as automatic noise limiting, variable squelch control, provisions for remote monitoring, panel meter for receive/transmit signal strength, separate antenna loading for maximum power on each channel, rust-proof exterior hardware, relays sealed against dust and corrosion, fungus-proof spray on components, capability of being installed at any angle, and an honest 80 watts output. And you can install this radiophone yourself! The owner's manual is complete in every respect. All FCC license information, and forms are included. Crystals for 2182 & 2638 kHz are included... specify additional channels (2 crystals/channel)... see listing below. Just have the final tune-up made by a 1st or 2nd class FCC licensed technician.

Assembled MWW-15, 31 lbs. \$375.00
 Assembled MWW-15R, 41 lbs. 150 watt 'phone plus remote control. \$474.00
 Assembled MWA-15-1, Radiophone remote control unit, 10 lbs. \$99.00
 Extra transmit & receive crystals (specify), 1 lb. each \$2.95

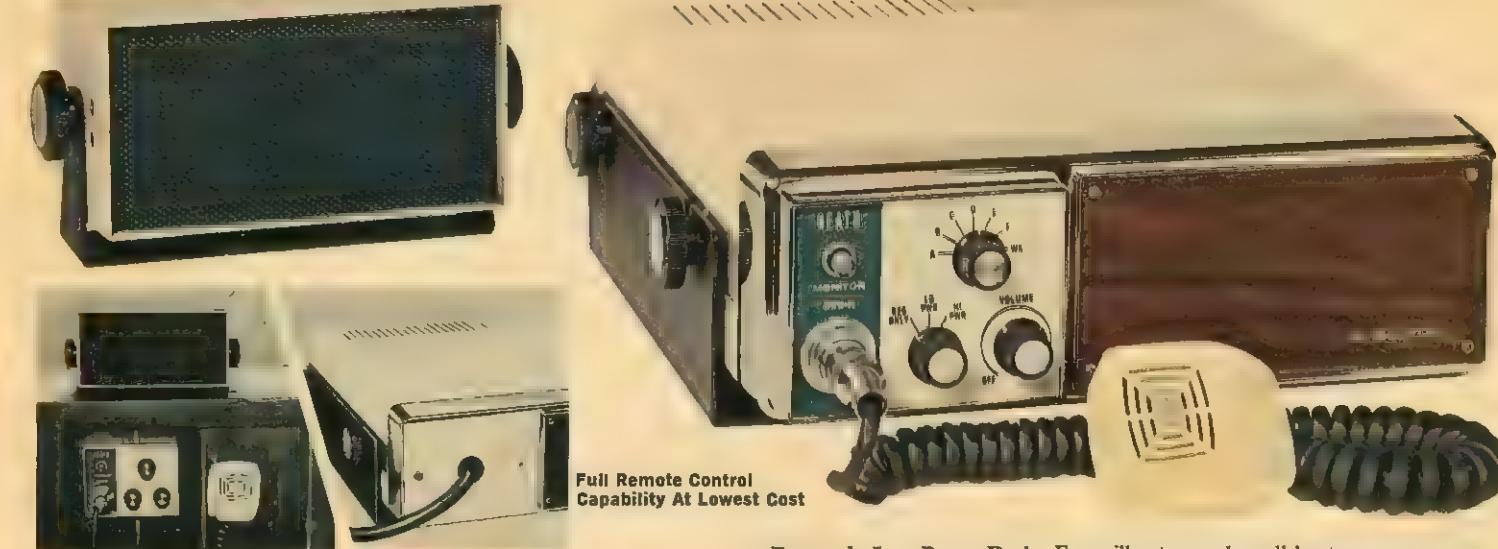
MWW-15 SPECIFICATIONS—RECEIVER: Frequency range: Marine, 2-5 MHz; Broadcast, 540-1620 kHz. Sensitivity: (providing 10 dB S/N ratio or better) Marine channels, 2 microvolts; Broadcast, 10 microvolts. Audio output: 3 watts to internal speaker/provision for external speaker, 15 watts to PA "deck-call." Transistor complement: (1) 2N1526 R.F. Amplifier; (4) 2N1525 Marine Crystal Oscillator Mixer, 2nd I.F. & 3rd I.F.; (1) T1364 1st I.F.; (3) 2N1274 AGC Amplifier, 1st & 2nd Audio; (2) R265A [2N1039] Audio Output; (4) SP836. [2] Modulator; (2) Power Inverter; (11) Diodes. TRANSMITTER: Frequency range: 2-5 MHz marine bands. RF input: 150 watts. RF Output: 80 watts. Transmitter tube complement: (1) 128Y7 Colpitts Oscillator; (1) 6H5 Power Amplifier. Power requirements: 12 volts DC. Receiver only, 0.6 amp. Standby, 2.9 amp. Transmit, 16 amps. Dimensions: 6 1/2" H x 11 1/4" W x 17" D.

Heath 25 Watt Radiotelephone For Medium Range Craft
 • Choose the complete MWW-13AS system for owner installation on outboards. Choose the MWW-13A for installation on any boat with FCC licensed technician checkout. Features 4 crystal-controlled transmit & receive channels. Covers 2-3 MHz marine bands. Exceptionally low current demands. Receives AM standard broadcast. Built-in heavy-duty solid-state power supply. FCC type accepted. Compact, factory assembled & ready to install. Supplied with crystals for 2182 kHz (calling & distress frequency) & 2638 kHz

Assembled MWW-13AS, Complete system for do-it-yourself installation on outboard powered boats only, includes radiophone, antenna & instructions, 22 lbs... (Express or Motor Frt.) \$189.95
 Assembled MWW-13A, Radiophone for technician installation on any boat, 17 lbs. \$164.95
 MDP-93, 13' Fiberglass Antenna, 5 lbs... (Motor Freight or Express Only) \$34.95
 MDP-103, Swivel lay-down base mount, 2 lbs. \$9.95
 Extra transmit & receive crystals (specify) 1 lb. each \$2.95

MWW-13A SPECIFICATIONS—Frequency range: 2-3 MHz Broadcast: 550-1600 kHz. Receiver sensitivity for 10 dB S/N ratio: Marine—3 microvolts—Broadcast—10 microvolts. Audio output: 3 watts to internal speaker. Transistor complement: (1) 2N1526 Mixer; (1) 2N1525 Oscillator; (1) T1364 1st I.F.; (1) 2N1274 1st Audio; (3) 2N1039 Audio Driver & Power Converters; (2) 2N1525 2nd & 3rd I.F.'s; (2) 2N301 Audio Output Modulator; (6) diodes, AVC, overload, Squelch, Noise Limiter & Detector. Transmitter RF input: 25 watts. RF Output: 13 watts. Transmitter tube complement: (1) 6AK6 Oscillator; (2) 6AQ5 amp. Power requirements: 12 V DC; broadcast receiver only, 350 amps.; standby, 1.2 amps.; transmit, 5 amps. Dimensions: 4 1/2" H x 8 1/4" W x 10 1/2" D.

New Heath VHF/FM Radiotelephone... Only \$499.95



Full Remote Control Capability At Lowest Cost

Extremely Low Power Drain. For sailboaters and small boat owners, power drain can be critical. The new MWW-18 uses only *sixty-thousandths of an ampere* on squelched receive only! Most other radiophones draw several times this amount.

Maximum Legal Power Output. The MWW-18 delivers a solid 25 watts *output*... the FCC-allowed maximum. You don't have to add expensive power-increasing devices to this radiophone. And a 1-watt output position on the function switch lets you conform to the latest rules for in-harbor power output.

Go VHF/FM... and discover, interference-free communications. Order your MWW-18 now... it's the best value in boating communications.

Assembled MWW-18 (with channels 6 & 16), 25 lbs. \$499.95
 MWA-18-1, Remote Control Accessory Package, 6 lbs. \$19.95
 MDP-108, 4 1/2" deck mt. tilt-over antenna w/20' coax. cable & BNC Connector, 4 lbs. \$29.95
 MDP-105, 4' mast mt. antenna for sailboats w/75' coax. cable & BNC Connector, 3 lbs. \$24.95
 MDP-107, 14' deck mt. fiberglass tilt-over mast antenna w/20' coax. cable & BNC Connector, 8 lbs. \$59.95
 MDP-108, 9' fiberglass whip 6 dB gain antenna, Lever-Action Weather (WX) Channel Receive only, 1 lb. \$49.95
 Weather (WX) Channel Receive only, 1 lb. \$8.50
 Environmental Channel 15 receive only, 1 lb. \$8.50
 Extra Transmit & Receive Crystals, pair, specify channel, 1 lb. \$17.00
 Add \$17.00 per additional channel for factory installed crystals (this permits owner installation of the radiophone).

MWW-18 SPECIFICATIONS—TRANSMITTER: Type: Hybrid, transistor and tube. Emission: 16F3 (± 5 kHz deviation FM). Number of channels: 6. Frequency range: 156.275-157.425 MHz. Power output: High Power: 25 watts max. Low Power: 1 watt max. Modulation: Phase modulation ± 5 kHz deviation. Modulation limiting: Automatic limiting meets all requirements of part 83 of FCC rules. Frequency accuracy: $\pm 0.001\%$ across temperature range without oven. RECEIVER: Type: Single conversion, superheterodyne all solid state. Frequency range: Two bands with two front ends, 156.275-157.425 MHz and 161.600-162.550 MHz. IF Amplifier frequency: 10.7 MHz. Number of channels: 7. Method of frequency control: Third overtone crystals. Sensitivity: 0.35 μ V or better for EIA usable sensitivity. Squelch: 0.2 μ V or better for max. sensitivity. Selectivity: 15 kHz @ 6 dB 28.8 kHz @ 60 dB. Audio output: 2 watts for less than 10% distortion. GENERAL: Size: 3 1/4" H x 10 1/2" W x 13 1/2" D. Weight: 22 1/2 lbs. Primary power: Voltage: 13.6 V DC nominal. Current: Receive only, squelched 60 mA; Transmit, high power, 10 amps. Antenna Impedance: 50 ohms resistive. Temperature range: -30° C—+60° C (—22° F to +140° F). Methods of control: Removable plug-in control head for local or remote use. Transistor, diode and tube complement: 39 transistors; 45 diodes; 3 tubes.

Questions & Answers About VHF/FM

What Is VHF/FM? VHF/FM is a combination of Very High Frequency (156-162 MHz) and Frequency Modulation. By comparison, the present Marine Band equipment operates from 2-3 MHz and uses Amplitude Modulation (AM). VHF/FM has been used for many years by Police & Fire departments, taxicab companies and public utilities.

What Advantages Does VHF/FM Have Over Present 2-3 MHz AM Marine Band Equipment? For mariners plagued with the congestion, ignition and atmospheric interference, and "skip" found on the present 2-3 MHz band, using VHF/FM equipment will come as a pleasant surprise. The greater number of channels available in the new band reduces congestion considerably... ignition & atmospheric noise are virtually non-existent... "skip" is eliminated by the different characteristics of VHF propagation. Additional benefits include the possibility of using very short antennas (some under 4 feet long) that are inexpensive and easy to install... ground systems are eliminated completely. Costly service calls for changing channel crystals are considerably reduced, as VHF/FM equipment doesn't require the tedious, time-consuming "loading" process needed by 2-3 MHz radios.

Should I Buy A New VHF/FM Radiophone? If you're in the market for a new radiotelephone, your best bet is to buy a new VHF/FM unit, because recent FCC rulings require all new installations after January 1, 1971 to be VHF/FM.

Outfit Your Craft With Heath Marine Gear... And Save

Heathkit MR-18 Mariner Solid-State 4-Band RDF Tunes AM, CW & SSB



MR-18
\$124.95

• Fast, accurate direction finding • Built-in Sense Circuit eliminates 180 degree ambiguity • Compass-Rose calibrated in 2° increments • Reliable solid-state construction using modern Field Effect Transistors • Low current drain • 4 ceramic filters in IF for sharp selectivity and elimination of IF alignment • Built-in product detector for SSB & CW reception as well as AM detector • Built-in switchable Automatic Noise Limiter • Extended frequency coverage from 180 kHz to 11.5 MHz in four bands • RDF capability to 4 MHz • Collapsible 35" whip antenna for Sensing & shortwave reception • Rechargeable nickel-cadmium battery included • Charges from 120/240 VAC or 13.5 VDC ship's power with built-in charger • Up to 10 hours of continuous duty with a full charge • Portable—includes carrying handle • Snap-on mounting base • Handsome white wrinkle finish with chrome, blue and black trim • Easy to build

Kit MR-18, 12 lbs. \$124.95

MR-18 SPECIFICATIONS—Frequency range: Longwave band, 180 kHz to 420 kHz. Broadcast band, 540 kHz to 1610 kHz. Marine band, 1.6 MHz to 4.05 MHz. Shortwave band, 3.95 MHz to 11.5 MHz. Sensitivity (For 6 dB signal plus noise-to-noise ratio): Longwave band, 70 μ V/meter. Broadcast band, 40 μ V/meter. Marine band, 20 μ V/meter. Shortwave band, 2 uV. Audio output power: 300 mW @ 10% maximum distortion. Speaker: 3x5" weather resistant. Direction indicator: 6 1/2" diameter compass rose calibrated in 2 degree divisions. Null & tuning indicator: Sealed meter, 80 μ A full scale. Antennas: Direction Finder: low impedance, balanced loop; rotates 360 degrees. Sense: whip antenna, extendable to 35'. Image rejection: Longwave band, 6 dB; broadcast band, 50 dB; marine band, 40 dB; shortwave band, 25 dB. BFO (Beat Frequency Oscillator): 455 kHz. Power capabilities: 9.6 volts, 500 milliamperes-hour rechargeable nickel-cadmium battery. Battery drain: 50 mA @ 50 mW audio output level; 25 mA at no audio output. Dimensions: 11 1/2" W x 6 1/2" H x 9" D (add 1/2" to height when the mounting plate is to be included). Net weight: 10 lbs.



MD-19
\$84.95
(less remote)

NEW... Heathkit Solid-State MD-19... Five New Functions For Your Boat... As Low As \$84.95

• Five different functions—Foghorn... Hailer... Boathorn... Listener... Intercom • All solid-state construction for maximum reliability • Powerful 30 watt amplifier • Individual controls for both rate and duration of Foghorn • Separate gain controls for both Listen and Hail functions • Boathorn and Foghorn always at full volume • Weather resistant horn included with kit • Foghorn automatically returns to listen mode between blasts • Addition of Remote Speaker Accessory gives communication between compartments on boat • Operates on 12 VDC ship's power • Comes with 20 feet of deck speaker cable and versatile gimbal mounting bracket • Handsomely styled in marine blue and white • Easy to assemble

Kit MD-19, 8 lbs. \$84.95
Kit MDA-19-1, Remote Speaker, 2 lbs. \$9.50

MD-19 SPECIFICATIONS—Output power: 30 watts continuous. Boat horn frequency: Approximately 260 Hz. Foghorn frequency: Approximately 180 Hz. Foghorn rate: Approximately 2 to 90 seconds, variable. Foghorn duration: approximately 2 to 20 seconds, variable. Speaker: 8 ohm weather resistant horn. Microphone: Ceramic with push-to-talk switch. Controls: Call volume; Listen volume; Station select; Function; Foghorn rate and duration. Power requirements: 12 VDC nominal, 5 A maximum. Idle current: 750 mA or less. Dimensions: 4 1/4" H x 9 1/4" W x 7 1/4" D. Color: White wrinkle and dark blue. Net weight (including horn): 9 lbs. 9 oz.

A Heathkit Solid-State Fuel Vapor Detector

Dependable solid-state circuitry gives assurance against explosion from accumulated gasoline fumes. "Fail-Safe"—sounds alarm in case of component failure. Meter reads "Safe-Dangerous-Explosive" and sounds alarm when fumes are present. Runs on 12 VDC. Rustproof marine black & white cabinet measures only 2 1/16" H x 5 11/16" W x 5" D.

Kit MI-25, 3 lbs. \$42.50

B Heathkit MP-14 Inverter Delivers AC Power Anywhere

Delivers up to 500 watts intermittent, 400 watts continuous & adjustable AC voltage output is regulated at 60 Hz to operate high current, high wattage devices (operates anything in power rating except motor driven devices with high starting currents). Ideal for test & scientific equipment operation at remote locations. 12-14.5 VDC operation.

Kit MP-14, 29 lbs. \$99.95

C Low Cost Heathkit Marine Power Converter

Converts 6 or 12 VDC to 117 VAC square wave, up to 175 watts continuous. Not recommended for high starting current and/or sine wave applications. Write for bulletin.

Kit MP-10, 8 lbs. \$32.50

D Heathkit Marine Radiotelephone Ground System

Poor grounding most often causes inadequate radiophone range. MD-14 provides more than enough. Two 8' tapered copper tubes, bolt thru keel (min. 9' L, max. 5" thick) & 1 thru-hull fitting.

Kit MD-14, 20 lbs. (Mtr. Frt. or Exp. only) \$29.95

E Heath Recommended University Deck Speaker

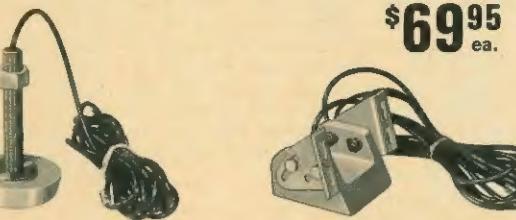
Handles up to 25 watts. 8 ohm impedance; 200-13,000 kHz response. Ideal with MWW-14A & MWW-15 Radiophones.

Model MDP-104, 7 lbs., mfr's list \$34.00. Net \$20.29

To add even more to your boating pleasure next season, check out the new GR-88 VHF-FM Monitor Receiver on p. 55.



Kit MI-19-1 & 2
\$69.95 ea.



MI-19-1 kit includes this Thru-Hull Mounting Transducer for permanent installation on larger displacement type craft.



MI-19-2 kit comes with this High Speed Transom Mount Transducer for temporary or permanent mounting on smaller boats & outboards.

NEW! Heathkit MI-19 Solid-State Depth Sounder With Exclusive Noise Rejection Circuitry

• All solid-state circuitry for maximum dependability and low current drain • Measures depth down to 200 feet with 5% accuracy • Exclusive Heath Noise Rejection Control allows user to operate MI-19 at full sensitivity without interference from engines • Adjustable Sensitivity Control for maximum signal strength without echoes • Calibrated dial is shielded from sunlight for easy reading • Weather, salt, humidity and corrosion-resistant design • Stainless steel hardware • MI-19-1 supplied with thru-hull mounting transducer • MI-19-2 comes with high-speed transom mount transducer • Can be used for spotting schools of fish and charting bottom • Operates from 12 VDC ship's power or external 12 VDC lantern battery • Simple, enjoyable 8-10 hour assembly time

Add Safety & Convenience To Your Boat... with the new Heathkit MI-19 solid-state Depth Sounder. Probes down to 200 feet to determine safe depth, locate underwater obstacles, chart the bottom for terrain and vegetation, even spot fish. Check the features and specs... and be convinced that the new MI-19 is your best buy.

Advanced Solid-State Design With Exclusive Heath Noise Rejection Circuitry. The all solid-state circuit comes on instantly, and battery drain is minimum. Simple to operate—turn the unit on with the combination On-Off/Sensitivity Control, adjust Sensitivity for maximum signal return from bottom without echoes and read the flashing light on the sun-shielded dial. The exclusive Heath Noise Rejection control eliminates a once troublesome cause of erroneous readings—ignition noise... just turn the control to cancel it out. Other features include completely weatherproof design, 5% accuracy, choice of transducer mounts, waterproof Operation Manual giving many dial indications & their meaning, and fast, easy assembly. Put this remarkable new accessory on your boat today.

Kit MI-19-1, complete with thru-hull transducer, 7 lbs. \$69.95
Kit MI-19-2, complete with high speed transom mount transducer, 7 lbs. \$69.95

MI-19-1 & 2 SPECIFICATIONS—Range: 0 to 200 feet on hard bottom. Sounding: Rate: 1440 per minute or 24 per second. Frequency: Approximately 200 kHz. Accuracy: Within 5% of actual depth. Depth indication: Neon lamp flashes at zero and again at the indicated depth from the object. Transducer: Barium titanate ceramic element encased in a watertight housing. Controls: Sensitivity, with on-off switch. Noise Rejection level. Transistor and diode complement: 9 transistors, 5 diodes. Power requirements: 80 to 100 milliamperes at 12 VDC. Dimensions: 7 1/4" W x 5 1/2" H x 5 1/4" D. Net weight: 4 1/2 lbs.



Kit MI-29
\$84.95



Portable Transducer Included. The MI-29 comes with this waterproof wide-angle transducer that attaches to the side or transom of your boat in seconds with large suction cups. 15' of transducer cable included.

NEW! Heathkit MI-29 Fish Spotter... Solid-State... Self-Contained... Completely Portable... Extra Wide Transducer... Sending Pattern For Better Coverage of Fishing Area

• Completely portable operation from two 6 VDC lantern type batteries • All solid-state design for light weight & low battery drain • Transducer sending pattern covers wider area... greatly increases area of water surveyed • Exclusive Heath Adjustable Noise Rejection Circuitry eliminates troublesome ignition noise • Adjustable Sensitivity Control for more accurate readings without echoes from bottom or vegetation • Completely waterproof and buoyant when case is closed to eliminate possibility of loss overboard • Non-Glare dial shielded from sun for easier reading • Small, portable transducer is fitted with suction cups for easy attachment to side or transom of boat • Can also be used for depth sounding down to 200 feet • Fast, easy assembly in 8 to 10 hours

An Invaluable Aid To Fisherman. The new Heathkit MI-29 solid-state Fish Spotter is a most versatile accessory for the ardent fisherman... spots schools and even individual fish... helps you determine the type of underwater terrain... aids you in finding layers of vegetation... even reads depth to 200 feet. Compare the MI-29 against similar units selling for up to three times its price! We think you'll find the Heathkit Fish Spotter a remarkable value.

Unique Features For Excellent Performance. Fishermen need a rugged, reliable, completely portable unit that's ready to go when they are... and the MI-29 fills the bill. The Fish Spotter is housed in a tough case designed to take rough conditions... it even floats! Runs on two readily available 6 VDC lantern batteries, and the solid-state circuit makes them last a long time... typical battery life is 80 hours. The exclusive Heath Noise Rejection Circuit lets you attach the portable suction cup mounted transducer close to your engine, without having to worry about ignition noise showing up on the glare-free dial. And the adjustable Sensitivity Control lets you adjust for maximum signal return without multiple echoes for clear readings. The waterproof Operation Manual gives many dial indications & what they mean. With the Heathkit Fish Spotter, the fish don't have an advantage over you anymore—order yours now.

Kit MI-29, 9 lbs., with portable transducer. \$84.95

MI-29 SPECIFICATIONS—Range: 0 to 200 feet on hard bottom. Sounding: Rate: 1440 per minute or 24 per second. Frequency: Approximately 200 kHz. Accuracy: Within 5% of actual depth. Depth indication: Neon lamp flashes at zero and again at the indicated depth from the object. Transducer: Barium titanate ceramic element encased in a watertight housing. Controls: Sensitivity, with on-off switch. Noise Rejection level. Transistor and diode complement: 9 transistors, 5 diodes. Power requirements: 80 to 100 milliamperes at 12 VDC. Batteries: (2 required) (not supplied). 6V Lantern type NEDA #908 or 916, Burgess F4M, Eveready #409 or 509, Ray-O-Vac #941. Battery life: (nominal) 80 hours. Dimensions: 6 1/4" W x 7" H x 10 1/4" D. Net weight: 6 1/2 lbs.

Heath/Mitchell Darkroom Accessories

Cut Paper Costs & Darkroom Time, Speed Enlarging & Make Fine Color Prints . . . With The Colorval Computer

• Accurately indicates ideal filter combination and correct exposure time for printing color negatives • Also functions like the Fotoval Computer in printing black & white negatives • Unique Color probe helps you to visually determine exact color correction • Separate light-sensitive exposure probe • Same 35mm test negative as used with Fotoval Computer for in-depth testing of paper grades • Built-in line voltage regulator • Sturdy all-metal cabinet • Mitchell Color Wheel also included

Colorval Darkroom Computer Reduces The Cost Of Color Printing . . . eliminates color cast, wasted paper and guesswork. The unique built-in Color Probe helps you visually determine correct filter combinations and the built-in Exposure Probe determines correct exposure. Then just print . . . easily, quickly, without guesswork. Order yours today.

Kit PM-17, 6 lbs. \$89.00

Assembled PMW-17, 6 lbs. \$125.00

An optional test negative for 4 x 5" enlargers is also available; order PMA-14-1, \$15.00 ppd.

PM-17 SPECIFICATIONS—Front panel controls: Channel selector switch; On-Off switch. Color probe controls: Lamp On-Off switch; Brightness control. Exposure probe control: Shutter. Power requirements: 105-125 or 210-220 volts AC, 50/60 Hz, 15 watts max. Cabinet dimensions: 7 1/4" W x 4 1/2" H x 8 1/2" D. Net weight: 4 1/2 lbs.

Heathkit Photo Timer Gives Electronically Accurate Exposure Control

• Controls exposure time of all printing operations—contact or enlarging • Two switch-selected ranges . . . up to 99 seconds in 1 second steps or 9.9 seconds in 0.1 second steps . . . permits accurate resetting of any interval • Repeatability accurate to within 2% on all settings • Two AC outlets . . . enlarger & safelight • All-electronic circuitry . . . no gear drive mechanisms to wear out as with "clock-motor" devices • Enlarger may be turned on or off manually with Time-Focus rocker switch • Install on wall, place upright or face up on working surface • Styled to match Heath/Mitchell Fotoval® Computer • Easy to assemble and use

Kit PT-15, 4 lbs. \$29.95

A Color Processor For Under \$20.00 . . . New Heath/Mitchell Color Canoe

• Produces the same high quality color prints as processors costing hundreds of dollars • Simple, 1 piece stainless steel functional design • Very small—easy to move, clean and store • Chemicals never touch the operator's hands • Self-leveling • Uses no more chemicals than other processors • No electrical power • Develops print face up—you can see what's happening • Can be used for B&W, Type R color and film (color, B&W, litho, etc.) • Produces completely even development consistently • Comes in 8x10", 11x14" and 16x20" sizes

Color Processing That You Can Afford . . . a unique design that delivers high quality results at extremely low cost. The print is presoaked in a tray of water at the correct temperature. The print is put in the bottom of the Canoe, which is floated in a tray. Pouring the 1st solution in, forms a "puddle" . . . first one side of the Canoe is lifted, then the other, distributing the chemicals over the face of the print evenly. Result? A color print comparable to any processed by other methods, but at a cost that makes sending out your work expensive by comparison. Order now.

PD-18, 8 x 10", 4 lbs. \$19.95

PD-28, 11 x 14", 6 lbs. \$26.95

PD-38, 16 x 20", 9 lbs. \$39.95

New Fotoval® II Darkroom Computer . . . A New, Simplified Way To Produce Excellent B&W Prints

The Fast, Low Cost Way To Fine B&W Printing & Enlargements. Guesswork about paper grade and exposure time is eliminated, and time, money and paper wasting test strips are a thing of the past. Following the comprehensive manual, each of your paper contrast grades is accurately tested & its characteristics are "memorized" by the computer. When you print a negative, just use the built-in Exposure Probe to monitor the negative contrast range . . . then read the correct paper grade (or filter) directly from the illuminated computer scale. It's fast, simple and virtually fool-proof. Choose the new Fotoval II either kit or assembled . . . either way, you'll be making excellent B&W prints—put it in your darkroom now.

Kit PM-18, 7 lbs. \$65.00

Assembled PMW-18, 7 lbs. \$92.00

• Produces beautiful B&W prints every time • Saves darkroom time, cuts paper costs, speeds enlarging • Automatically determines paper grade & exposure time • Electronic line voltage regulation for accuracy • Comes with special 35mm test negative for in-depth testing of paper grades • Fast, inexpensive conversion to complete color capability with accessory Color Probe kit available soon • Fast, enjoyable assembly

Kit PMA-14-2, 4 lbs. \$49.00

Kit PMA-14-1, 15.00 ppd.

Kit PMW-18, 7 lbs. \$92.00

Kit PMA-14-2, 4 lbs. \$49.00

Kit PMA-14-1, 15.00 ppd.

Kit PMW-18, 7 lbs. \$92.00

Kit PMA-14-2, 4 lbs. \$49.00

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Kit PMA-14-2, 4 lbs. \$49.00

Kit PMA-14-1, 15.00 ppd.

Kit PMW-18, 7 lbs. \$92.00

Solid State Portables

Deluxe 12" Diagonal B & W Transistor Portable TV

• 74 sq. inch (picture diagonal 12") 110° shell bond picture tube • 36 transistor, 26 diode circuitry including integrated sound circuit that replaces 39 component parts • Plays anywhere . . . runs on household 117 v. AC, any 12 v. battery or accessory rechargeable battery pack • Instant "On" AC operation • Covers all channels, 2 through 83 • UHF dual speed tuning • VHF "memory" fine tuning—no need to fine tune when switching channels • 3-stage IF for maximum gain with controlled bandwidth • Gated automatic gain control for steady, jitter-free pictures • Transformer regulated power supply • Circuit breaker protection • One-piece, swing-out chassis for easy assembly and servicing • Rugged high-impact, designer styled plastic cabinet with carrying handle • Preassembled and aligned tuners assure peak performance, speed construction . . . takes only 12 hours • Front panel-mounted speaker • 1-year warranty on picture tube, 90 days on all other parts

Now Enjoy TV Wherever You Go with the versatile Heathkit GR-104A. Makes an ideal "extra" TV for any room in the house . . . bedroom, kitchen, den, rec room. Its light weight and compact shape make for easy carrying. And with the optional battery pack, you can take it fishing, camping, hunting, on a picnic, to the beach . . . anywhere your travels take you. You can even run it off your boat or car's 12 v. DC battery. Delivers 74 sq. inches of crisp black & white pictures. And the pictures come on instantly . . . no waiting around for set warm-up before you tune the picture. Includes a built-in telescopic VHF whip antenna, plus an 8" UHF loop that attaches to the back panel. Has inputs for 300 ohm antennas. Includes blue-gray plastic cabinet with pearl mask.

Kit GR-104A, portable TV for 117 v. AC and 12 v. DC operation, 27 lbs. \$124.95
Kit GRA-104-1, rechargeable battery pack and outdoor sun shield, 9 lbs. \$39.95
GRA-104-2, outdoor sun shield only, 1 lb. \$1.95

GR-104A SPECIFICATIONS—Picture Size: 74 sq. in. viewing area, picture diagonal 12". Deflection: Magnetic, 110 degrees, 20 mm neck. Focus: Electrostatic. Antenna Input Impedance: 300 ohm balanced. Tuning Range: VHF TV Channels 2 thru 13, UHF TV channels 14 thru 83. Picture IF Carrier: 45.75 MHz. Sound Carrier: 41.25 MHz. Sound IF Carrier: 4.5 MHz. Video Response: To 3.5 MHz. Audio Power Output: 500 milliwatts into 24 ohm load. Controls (front panel): UHF coarse tuning; UHF fine tuning, VHF channel selector, VHF fine tuning. OFF/On volume, brightness, contrast, vertical hold, horizontal hold. Controls (rear panel): Vertical linearity, Vertical height, Low voltage adjust, AGC. Transistor & Diode Complement: 36 transistors, 26 diodes, 1 picture tube. Power Requirement: 110-130 volts AC @ 0.35 amperes, 40 watts; 12 volts DC @ 1.7 amperes, 20 watts. Overall Size: 11 1/2" H, 15 1/4" W, 9-5/16" D. Net weight: 20 lbs.

Heathkit AM-FM Solid-State Portable . . . Performance Others Can't Match

• Peak performing 12 transistor, 7 diode circuit • Pre-aligned AM-FM front end like those used in Heathkit hi-fi tuners • 4" x 6" oval speaker for bigger, better sound • 3 FM IF stages for 5 uV sensitivity • Tone control • Built-in telescoping whip antenna for FM • AFC on FM • Amplified AGC on AM • External earphone jack and earphone • Circuit board construction for fast, easy assembly

Lightweight, rugged, reliable performance . . . AM or FM at the flick of a switch . . . and what reception! The big 1/2" diameter ferrite rod antenna pulls in AM stations other portables can't get and the three tuned transformers and amplified AGC provide clear, stable listening. The FM section features a telescoping 34" whip antenna, three IF stages and 5 uV sensitivity for sharp, accurate tuning . . . and the AFC keeps that station locked in. The biggest sound around . . . the audio output to the 4" x 6" speaker is 350 milliwatts—enough to fill a house! And with the GR-17, you don't have to worry about fading power from weak batteries—the Zener diode biased IF strip keeps the gain constant down to minimum useable battery voltage. And this portable is easy on batteries too—runs 200-300 hours on a single set of 6 "D" cells in normal use . . . a lot longer with the optional converter/charger. Quality components, famous Heath engineering and low cost spell value. Order your's now and discover a real portable performer—the GR-17.

Kit GR-17, 5 lbs. \$43.95
Model GRA-43-1, Converter/Charger for 117 v. 60 Hz AC, 1 lb. \$6.95



GR-17 SPECIFICATIONS—AM SECTION: Tuning Range: 535 kHz-1620 kHz. Intermediate frequency (IF): 455 kHz. Sensitivity: 200 microvolts per meter for 20 dB signal-to-noise ratio. FM SECTION: Tuning range: 88-108 MHz. Intermediate frequency (IF): 10.7 MHz. Sensitivity: Less than 5 microvolts per meter for 30 dB quieting. GENERAL: Speaker: 4" x 6" oval, permanent magnet, 16 ohm voice coil. Audio output: 350 mW. Batteries: Six 1 1/2 volt "D" cells (not supplied). Approximate battery life: 200 to 300 hours of normal listening levels. Current drain: Idling current: AM—approximately 15 mA. FM—approximately 18 mA. Normal listening level: AM—approximately 22 mA. FM—approximately 25 mA. Full volume: AM and FM—approximately 70 mA. Dimensions: 8 1/4" W x 6 1/4" H x 4" D. Net weight: 4 1/4 lbs. (with batteries).

No Need To Hold This AM Portable To Your Ear . . . It's Got Big Sound Miniatures Can't Deliver

• 6 silicon transistor, 2 diode circuit gives 8 transistor performance • Uses 6 standard "D" size flashlight batteries (not included) . . . only 1/10 the operating cost of typical pocket-size portables • Large 4" x 6" permanent magnet oval speaker for "big-set" sound • Easy-to-read slide-rule dial • "Thumb-touch" controls • Vernier tuning • Tuned RF stage & double-tuned IF stage for greater sensitivity & selectivity • Big 1/2" diameter built-in rod antenna for distant station reception • Handsome black simulated leather case • Fast, simple circuit board construction

Kit GR-24, 5 lbs. \$28.25

GR-24 SPECIFICATIONS—Tuning range: 535-1620 kHz. IF frequency: 455 kHz. Sensitivity: 50 uV/m for 10 dB signal-to-noise ratio at 50 mw output. Audio output: 250 mw @ 10% distortion. Speaker: 4" x 6" oval permanent magnet type. Battery: 6 "D" flashlight cells. Current drain: No signal: 11 mA; 50 mw audio output: 41 mA. Dimensions: 3 1/4" D x 8 1/4" W x 7" H (overall).

Yes You Can! Build This AM Portable. See How Easy It Is. Includes Batteries & Tools

• 6-transistor, 3-diode circuit • 4" x 6" speaker for "big-set" sound • Built-in ferrite rod antenna for distant station pickup • Pre-aligned coil and IF transformers assure peak performance • Rugged simulated tan leather case • Fast, simple circuit board construction

Goes From Parts To Programs In Just 4 To 6 Hours. Includes everything you need to begin this fascinating, kit-building hobby . . . solder, soldering iron, wire stripper & cutter, screwdriver, nut starter, alignment tool—even the batteries to power your new radio. Simple step-by-step instructions, giant pictures and diagrams, plus fast circuit board construction assure your success. And the sound? Clean, robust and sensitive . . . with a big console quality.

Kit GR-151A, radio, tool kit and 6 "C" cell batteries, 5 lbs. \$21.95



New Stereo Phono Outperforms All Others



Kit GD-109
\$74.95



Two swing-out, detachable, full-range speakers.



Compact 18-watt amplifier—easy to build.



Changer tilts down for play, up for carry.

A Versatile Unit With Handsome Styling. Although it's in a portable case, the GD-109 can be set up like the expensive component systems. The changer tilts down for play or up for dust-free storage. The speaker enclosures snap away from the cabinet and swing out. Then each can be lifted off and placed up to 5' away from the changer for better stereo separation. The GD-109 cabinet covering has a texture like leather. High wear areas are covered with durable, plastic coated cloth.

So Simple A Youngster Can Build It. It will take you only one or two pleasant evening sessions (about 5-7 hours) to build your GD-109. The speaker enclosures and the changer cabinet come assembled. You simply mount the speakers behind the grilles and wire them. All amplifier components mount on one easy to build circuit board.

Years Of Pleasant Listening . . . Order your GD-109 today, and begin a lasting listening experience.

Kit GD-109, 38 lbs. \$74.95

GD-109 SPECIFICATIONS—CHANGER: Type: Maestro Model 55. Speeds: 16, 33 1/2, 45 & 78 RPM. Record sizes: 7", 10", 12". Cartridge: Stereo ceramic. Stylus: 0.7 mil diamond for LP's, 3 mil sapphire for 78's. AMPLIFIER: Power output: 18 watts, 9 watts per channel, EIA music power. Frequency response: ±3 dB, 30 Hz to 15 kHz. Equalization: RIAA. Transistors: (10) 2N393, (4) X29A929, (4) TA2911. Diodes: (4) MZ2360, (2) MZ2362, (4) Silicon diodes. Controls: Volume, tone and balance. Speakers: Two 4 1/2" full range, high compliance with 8 ohm voice coils. GENERAL: Dimensions: Overall, 14 1/4" H x 7 1/2" D x 24-5/16" W. Speaker only, 14 1/2" H x 4 1/2" D x 7 1/2" W. Power requirements: 120 V, 60 Hz AC 25 watts.

Build This Stereo In One Evening . . . Enjoy It For Years

• Automatic or manual stereo and mono play of any size 16, 33 1/2, 45 & 78 rpm records • All solid-state circuit for cool, instant operation and long, trouble-free life • Ceramic cartridge with dual Diamond/Sapphire stylus for LP's or 78's • Fold-up changer and easy-grip handle for portability • Volume, Stereo Balance and Tone Controls • Twin 4" x 6" speakers and "in-depth" cabinet design for crisp highs and deep bass others can't match • Safe, "shockproof" operation • Plays on any 120 v. 60 hertz source • 45 rpm adapter spindle • Preassembled, pressed wood cabinet covered in handsome avocado green and ivory polyethylene with red speaker grilles • Builds easily in just 3 to 4 hours

Runs Cool, Looks Cool. The 8-transistor amplifier delivers up to 1 1/2 watts per channel through the 4" x 6" speakers for real room-filling sound. And its avocado green and sunfire red suitcase styling make it easy to look at, easy to carry. Builds in one evening, keeps you entertained for years. Kit GD-107, 29 lbs. (Express or motor freight) \$54.95

GD-107 SPECIFICATIONS—CHANGER: Type: Maestro Model 52-93. Speeds: 16, 33 1/2, 45, and 78 RPM. Record Sizes: 7", 10", and 12". Cartridge: Stereo ceramic. Stylus: 0.7 mil diamond for LP's, 3 mil sapphire for 78's. AMPLIFIER: Power output: 3 watts, 1 1/2 watts per channel EIA music power. Frequency response: ±5 dB 100 Hz to 10 kHz. Equalization: RIAA. Transistors and Diodes: 4 2N393, 2 2N2430, 2 2N2431, 1 silicon diode. Speakers: 2 4" x 6" 25 ohm voice coils. Controls: Volume, tone, and balance. GENERAL: Dimensions: 15" H x 8 1/2" D x 25 3/4" W. Power requirements: 120 V, 60 Hz AC, 15 watts.

Scout Project Idea . . . 4-Speed Mono Phono, Plays 6, Shuts Off

• Automatic monophonic play of 16, 33 1/2, 45 & 78 rpm records • Plays stereo records monophonically, too, without damage • All solid-state circuitry for cool, instant operation • Ceramic cartridge with dual Sapphire stylus for LP's or 78's • Compact size, light weight and easy-grip handle for portable convenience • Separate volume & tone controls • Operates on any 120 V. AC household source • Includes 4" x 6" speaker, 45 rpm adapter spindle, and preassembled pressed wood cabinet covered with attractive, durable olive and ivory polyethylene • Easily assembled in just 1 to 2 hours Kit GD-16, 25 lbs. \$39.95

GD-16 SPECIFICATIONS—CHANGER: Type: Maestro Model 52-79. Speeds: 16, 33 1/2, 45, and 78 RPM. Record Sizes: 7", 10", and 12". Cartridge: Ceramic. Stylus: 0.7 mil sapphire for LP's, 3 mil sapphire for 78's. AMPLIFIER: Power output: 2 watts EIA music power. Frequency response, ±5 dB 100 Hz to 10 kHz. Equalization: RIAA. Transistors and diodes: 2 2N393, 1 2N2430, 1 2N2431, 1 silicon diode. Speaker: 4" x 6", 25 ohm voice coil. Controls: Volume and tone. GENERAL: Dimensions: 14" H x 7 1/2" D x 20 1/2" W. Power requirements: 120 V, 60 Hz AC, 15 watts.



Kit GD-107

\$54.95



GD-16

\$39.95

HEATH COMPANY

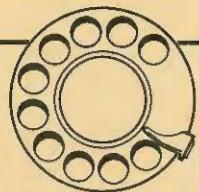
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Day or Night



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Michigan time, call area 616, 983-3961
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Nights & Weekend—for C.O.D. orders
only, call area 616, 983-3921 and our
Electronic Secretary will record your
order. After 8 p.m., your time, you can
call from anywhere in the U.S., except
Hawaii and Alaska, for \$1 or less.

All prices quoted are Mail Order, Net F.O.B. Benton Harbor, Michigan
and apply to United States and Possessions only.
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All prices and specifications subject to change without notice.
Printed in U.S.A.

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ELLIOTT CY MD 21043

K-21

New Ideas For The New Year From Heath



NEW Heathkit GD-109 18 Watt Stereo Portable
Phonograph with high compliance speakers in
detachable enclosures . . . see page 63



NEW Heathkit AR-19 60 Watt AM-FM-FM
Stereo Receiver . . . engineered in the tradition
of the famous AR-15 . . . see pages 8 & 9



NEW Heathkit SB-220 2KW PEP Linear Amplifier, 80 through 10 meters . . . see page 43

In the Heath tradition of offering superior electronic equipment at substantial savings, we're starting off the 70's by introducing these seven new products!



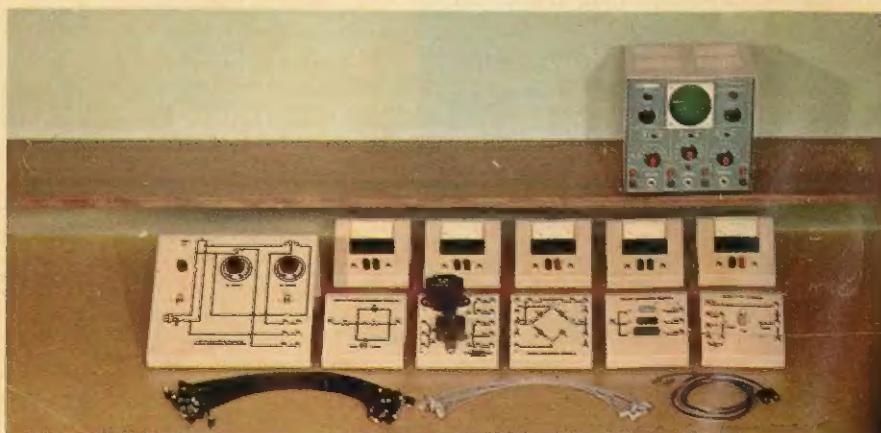
NEW Heathkit MWW-18 VHF FM Radiotelephone
. . . factory assembled & FCC type-accepted . . .
see page 57



NEW Heathkit MI-29 solid-state portable Fish Spotter . . . an invaluable aid to fisherman . . . see page 59



NEW Heathkit MI-19 solid-state Depth Sounder with
exclusive noise rejection circuitry . . . see page 59



NEW Heath IDW-39 factory assembled X-Ray Machine Simulator . . . safe, low cost
way to teach x-ray machine operation . . . see page 42.